- Specifications

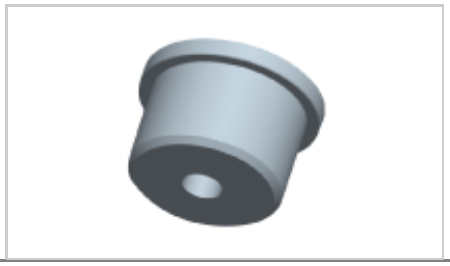
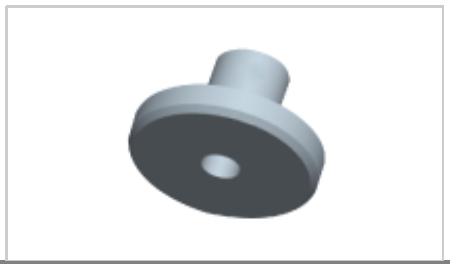
Tightening Torques

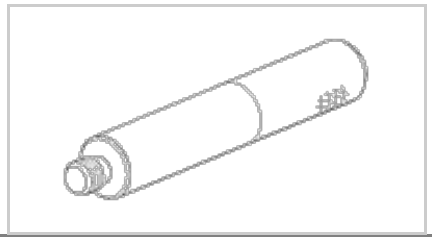
Items	N.m	Kgf.m	lb-ft
Transfer assembly mounting bolts	60.8 - 65.7	6.2 - 6.7	44.8 - 48.5
AWD ECM mounting nuts	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Coupling assembly mounting bolts	56.9 - 64.7	5.8 - 6.6	42.0 - 47.7
Propeller shaft mounting bolts	49.0 - 68.6	5.0 - 7.0	36.2 - 50.6
Transfer oil drain plug	39.2 - 58.8	4.0 - 6.0	28.9 - 43.4
Transfer oil filler plug	39.2 - 58.8	4.0 - 6.0	28.9 - 43.4

- Lubricants

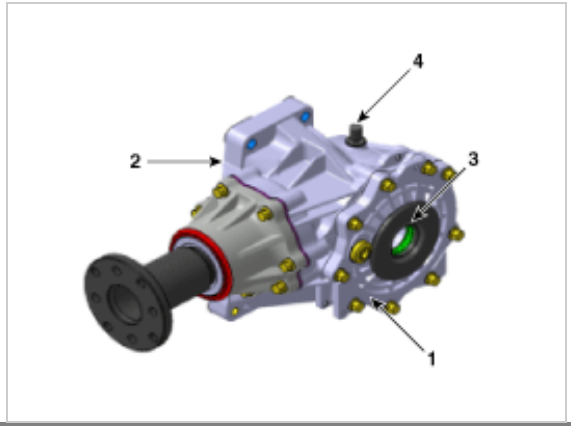
Engine	Items	Specification	Capacity
Gasoline 3.8	Transfer oil	API GL-5, SAE75W/85 Hypoid gear oil (SK HCT-5 75W85 equivalent)	Filled up to lower filler plug thread level. 0.70 L ± 0.0325 L (0.18 U.S gal, 0.74 U.S qt, 0.62 Imp qt) ± (0.01 U.S gal, 0.03 U.S qt, 0.03 Imp qt)
	Coupling oil	SHELL TF0870C or TF0870B	410ml ± 20.5ml (0.10 U.S.gal., 0.43U.S.qt, 0.36 Imp.qt.) ± (0.005 U.S.gal., 0.021 U.S.qt, 0.017 Imp.qt.)

- Special Service Tools

Engine	Tools (Number and name)	Illustration	Use
Gasoline 3.8	09473-S1100 Oil seal installer		Installation of transfer case oil seal. with the bar (SST No. : 09231-H1100). (Transaxle side)
	09473-S1200 Oil seal installer		Installation of transfer case oil seal. with the bar (SST No. : 09231-H1100). (Driveshaft side)
	09231-H1100 Bar		Used with oil seal installer.

- Trouble shooting

Area of leakage occuring	Area	Applied engine
① Connecting part/under part of transfer case ② Connecting part of transmission ③ Assembly part of drive shaft ④ Air bleeder part		R2.0/2.2 Theta 2.0/2.4 Nu 2.0
	Click to see large image...	Lambda 3.3/3.5/3.8 S 3.0

Symptom	Expected cause	Countermeasure
Oil leakage	Oil leakage on connecting part of transfer case (①)	Adjustment or replacement, adjustment
	Oil leakage on under part of transfer case (①)	Adjustment or replacement, adjustment
	Oil leakage trace on connecting part of transmission (②)	Adjustment
	Oil leakage at assembly part of drive shaft (③)	Adjustment or replacement, adjustment
	Oil leakage trace around air bleeder (④)	Adjustment
	Upside down the oil seal main lip (②, ③)	Replacement

	Pushed aside oil seal (②, ③)	Replacement
	fallen out oil seal (②, ③)	Replacement
	Spline abrasion (check whether spline at transmission has abrasion or not)	Adjustment or replacement, adjustment
Noise	"Repeated clicking noise" noise while driving	Adjustment
	"Repeated tapping noise" noise from under the vehicle while full turn circling	Adjustment
	"Clunking noise" noise when the vehicle accelerate rapidly or braking rapidly. - Spline abrasion (check whether spline at transmission has abrasion or not)	Adjustment or replacement, adjustment

※ Range of "adjustment"
- Clean out the oil or trace of grease leakage
- Check whether engine or transmission has oil leakage and oil flow down or not.
- Check the parts that is related to trouble area.

- Inspection

Information
- Transfer oil should be inspected and refilled every 60,000 km (40,000 mile) / 4 year.

CAUTION
- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

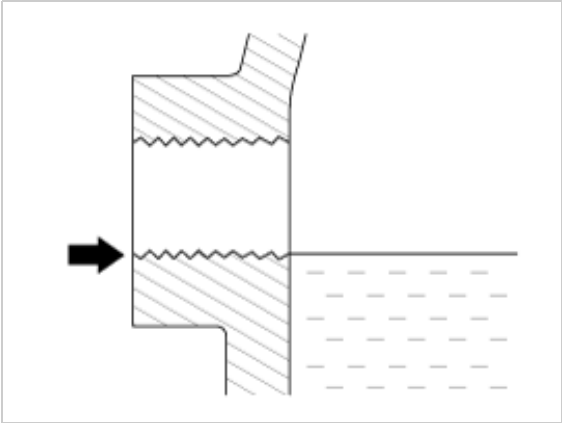
1. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
2. Loosen the oil filler plug (A).

Click to see large image...

3. Check the oil level.

Information

- Oil level must be up to fill the hole, if not, add oil until it runs over.



4. Install the oil filler plug with new gasket.

   Tightening torque :

   39.2 - 58.8 N.m (4.0 - 6.0 kgf.m, 28.9 - 43.4 lb-ft)

5. Install the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")

- Replacement

Information

Change		Capacity	Specification
Normal Use	Severe Use	Filled up to lower filler plug thread level. **Gasoline 3.8 :**0.70 L ± 0.0325 L (0.18 U.S gal, 0.74 U.S qt, 0.62 lmp qt) ± (0.01 U.S gal, 0.03 U.S qt, 0.03 lmp qt)	API GL-5, SAE75W/85 Hypoid gear oil (SK HCT-5 75W85 equivalent)
No service required	120,000 km (80,000 miles)		

Severe driving conditions

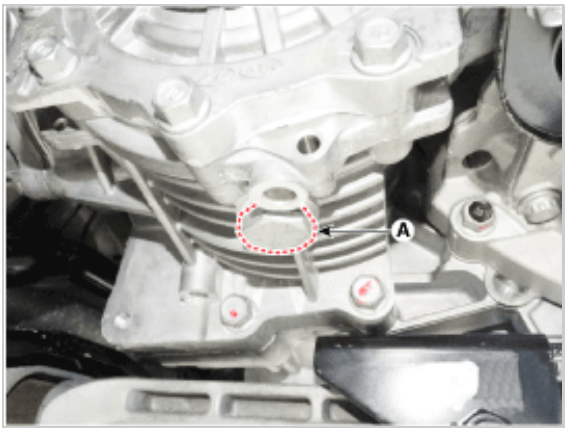
- Driving in dusty, rough roads
- Drivng in mountains areas
- Driving for patrol car, taxi, commercial car or vehicle towing
- Driving over 170Km/h

* Transfer oil should be replaced if the transfer assembly is fall into the water.

CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
2. Drain the transfer oil after loosening the drain plug (A).



3. Install the drain plug with new gasket.

Tightening torque :
39.2 - 58.8 N.m (4.0 - 6.0 kgf.m, 28.9 - 43.4 lb-ft)

4. Refill the transfer specified oil after loosening the filler plug (A).

Specified oil :API GL-5, SAE75W/85 Hypoid gear oil (SK HCT-5 75W85 equivalent)
Capacity : Filled up to lower filler plug thread level.
Gasoline 3.8 :0.70L ± 0.0325L
(0.18 U.S gal, 0.74 U.S qt, 0.62 Imp qt) ± (0.01 U.S gal, 0.03 U.S qt, 0.03 Imp qt)

Click to see large image...

5. Install the filler plug with new gasket.

Tightening torque :

39.2 - 58.8 N.m (4.0 - 6.0 kgf.m, 28.9 - 43.4 lb-ft)

6. Install the under cover.
(Refer to Engine Mechanical System - "Engine Room Under Cover")

- Components Location

[Gasoline 3.8]

Click to see large image...

1. Trasaxle assembly
2. Transfer assembly
3. Propeller shaft assembly
4. Coupling assembly

- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
2. Remove the sub frame.
   (Refet to Suspension System - "Sub Frame")
3. Remove the front drive shaft assembly.**[Right side]**
   (Refer to Driveshaft and Axle - "Front Driveshaft")
4. Remove the front muffler.
   (Refer to Engine Mechanical System - "Muffler")
5. Remove the front propeller shaft assembly (A) from the transfer assembly.

Tightening torque :
49.0 - 68.6 N.m (5.0 - 7.0 kgf.m, 36.2 - 50.6 lb-ft)

⚠ CAUTION

- Do not reuse bolts.

Click to see large image...

6. Remove the transfer case assembly.

Tightening torque :

60.8 - 65.7 N.m (6.2 - 6.7 kgf.m, 44.8 - 48.5 lb-ft)

1) Loosen the transafer assembly upper mounting bolts (A).

Click to see large image...

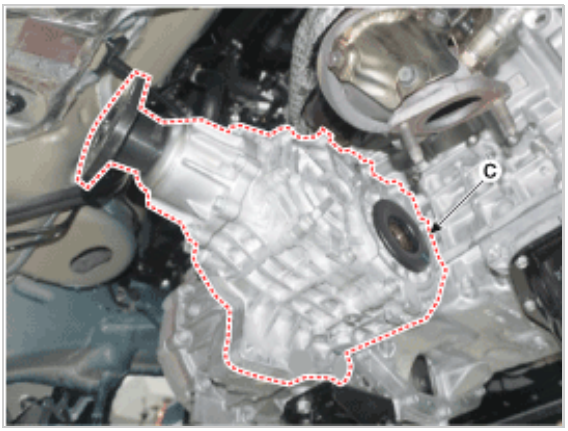
2-1) Loosen the transfer assembly lower mounting bolts (B).**[Transfer ->Transaxle]**

Click to see large image...

2-2) Loosen the transfer assembly lower mounting bolts (B).**[Transaxle ->Transfer]**

Click to see large image...

3) Remove the transfer assembly (C).



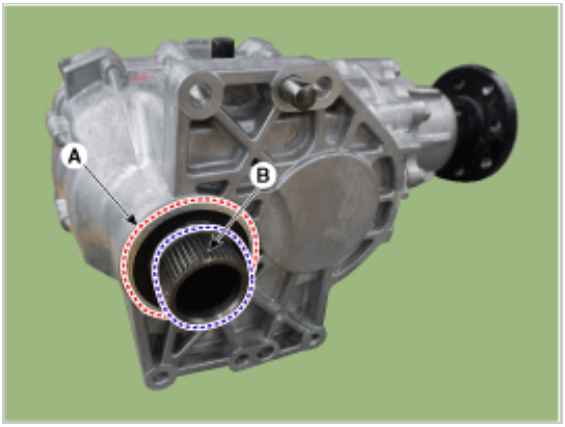
- Installation

1. To install, reverse the removal procedures.

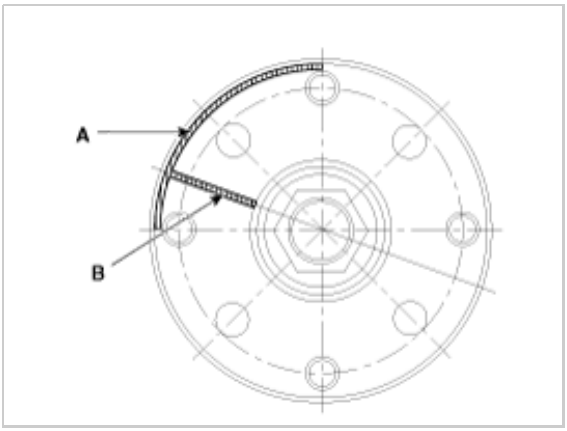
NOTICE

- Be careful not to damage the O-ring (A). If the O-ring is damaged, replace with a new one.
- Smear and cover splines (B) with molybdenum type high pressure grease.

  GREASE SPL-1 equivalent (MS511-07)



- Install the propeller shaft to be near runout marking (Transfer assembly 1ea (A), propeller shaft 1ea (B) each other.



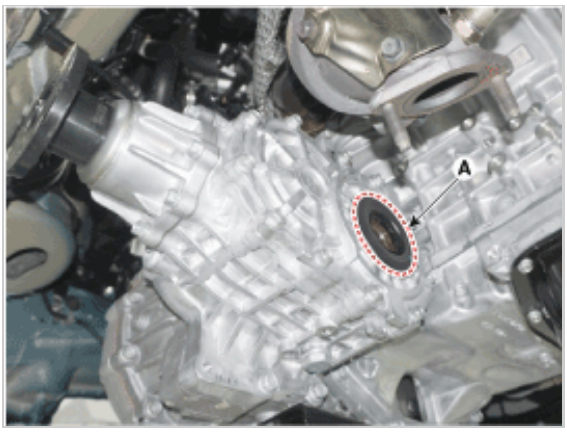
- Replacement

[Driveshaft side oil seal]

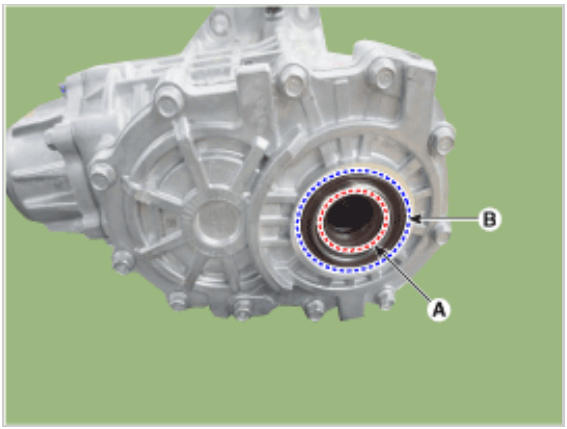
⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
2. Remove the sub frame.
   (Refer to Suspension System - "Sub Frame")
3. Remove the front driveshaft assembly.**[Right side]**
   (Refer to Driveshaft and axle - "Front Driveshaft")
4. Remove the front muffler.
   (Refer to Engine Mechanical System - "Muffler")
5. Remove the dust cover (A).

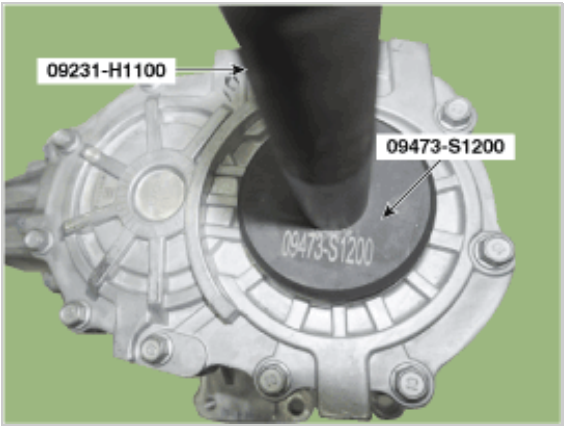


6. Remove the transfer oil seal (A), (B).



7. Replace the oil seal with special service tools.

[Gasoline 3.8]



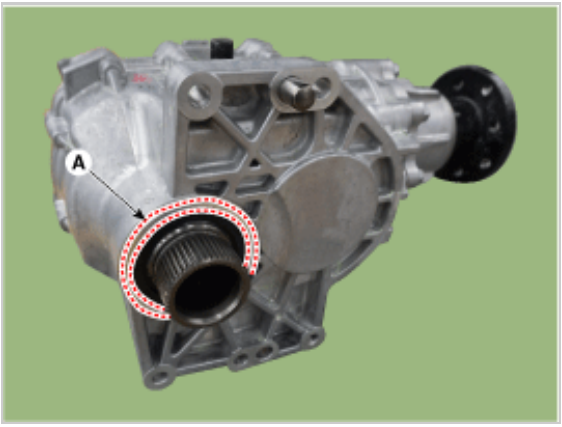
8. Remove the special service tools.
9. Install the new dust cover.
10. Install the front muffler.
    (Refer to Engine Mechanical System - "Muffler")
11. Install the front driveshaft assembly.**[Right side]**
    (Refer to Driveshaft and axle - "Front Driveshaft")
12. Install the sub frame.
    (Refer to Suspension System - "Sub Frame")
13. Install the under cover.
    (Refer to Engine Mechanical System - "Engine Room Under Cover")

[Transaxle side oil seal]

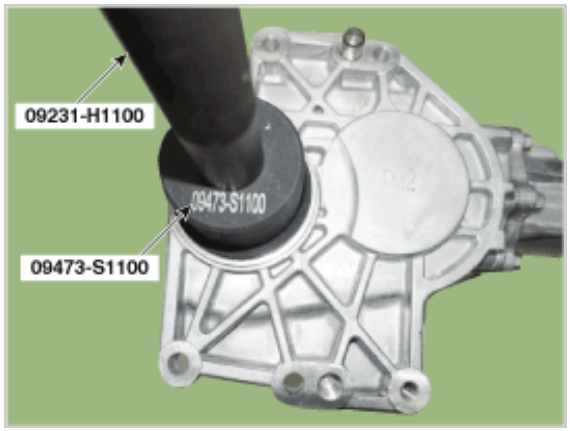
⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the transfer assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Front Wheel Transfer Assembly")
2. Remove the transfer assembly oil seal (A).



3. Replace the oil seal with spacial service tools.



4. Remove the special service tools
5. Install the transfer assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Front Wheel Transfer Assembly")
6. Install the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")

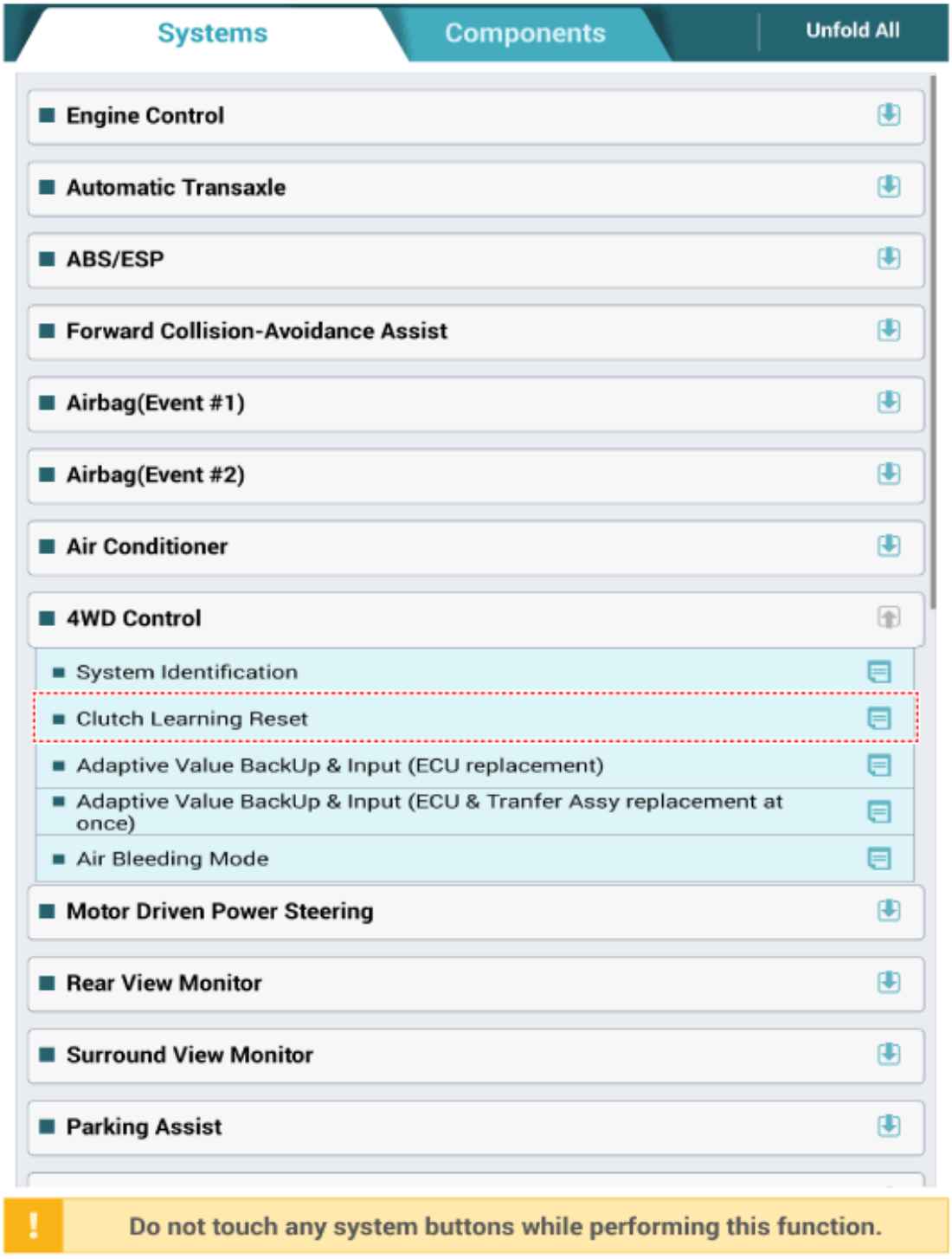
- Adjustment

Description

The friction material inside the coupling will degrade over time. Therefore, corresponding compensation values must be referenced and entered after replacing the controller or the coupling.

Compensation Requirement and Procedure

1. Simultaneous replacement of AWD ECU (Controller) and coupling
   Does not require compensation.
2. Replacement of coupling only
   1) Reset the AWD ECU's (Controller) clutch learning.


Systems
Components
Unfold All
Engine Control
Automatic Transaxle
ABS/ESP
Forward Collision-Avoidance Assist
Airbag(Event #1)
Airbag(Event #2)
Air Conditioner
4WD Control
System Identification
Clutch Learning Reset
Adaptive Value BackUp & Input (ECU replacement)
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
Air Bleeding Mode
Motor Driven Power Steering
Rear View Monitor
Surround View Monitor
Parking Assist
Do not touch any system buttons while performing this function.

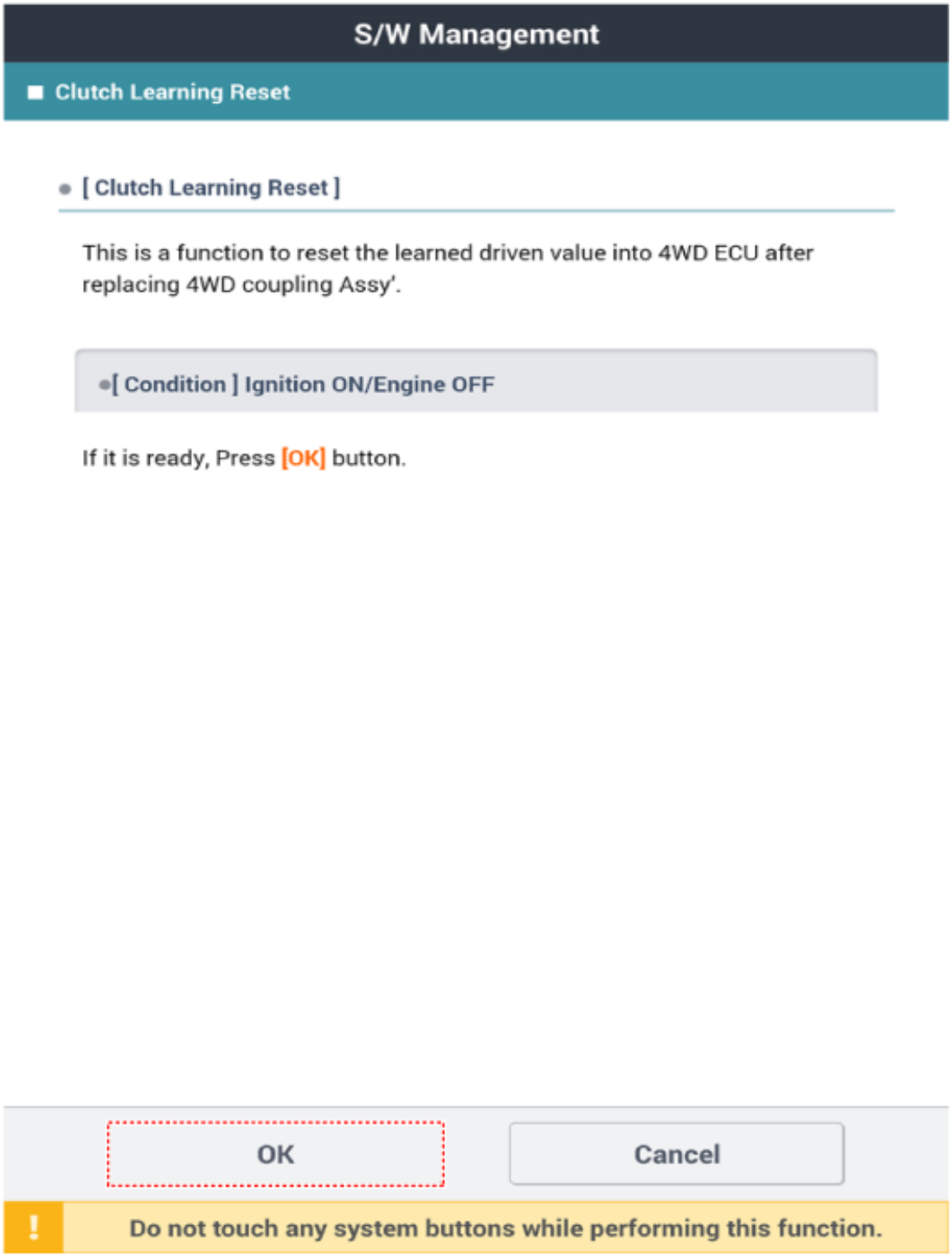
S/W Management

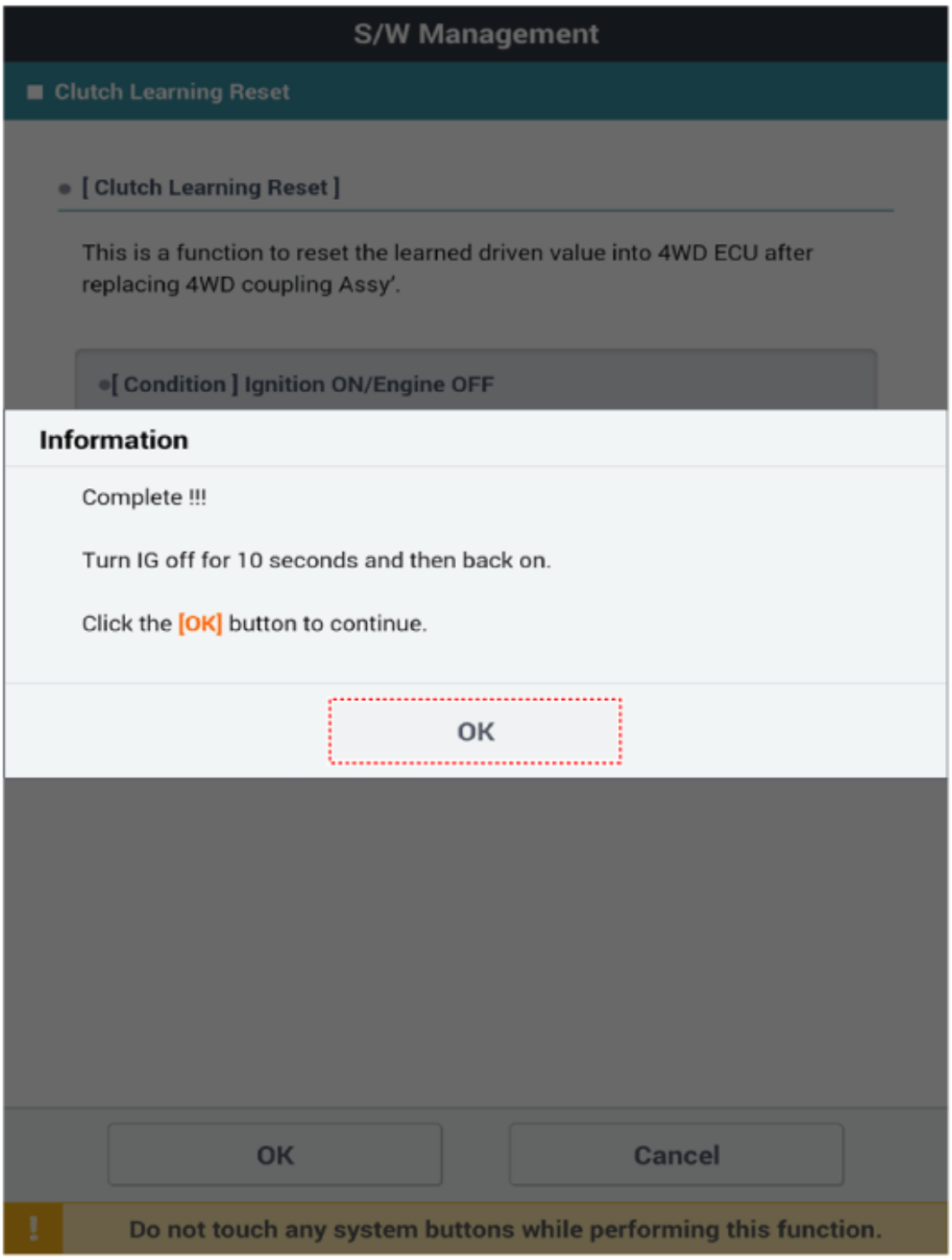
• **Clutch Learning Reset**

Purpose	To reset adapted clutch wear value on the 4WD ECU after 4WD coupling assembly is replaced.
Enable Condition	1.Engine Off 2.Ignition Switch On
Concerned Component	PCM/ECM, 4WD ECU
Concerned DTC	-
Fail Safe	-
Etc	-

OK

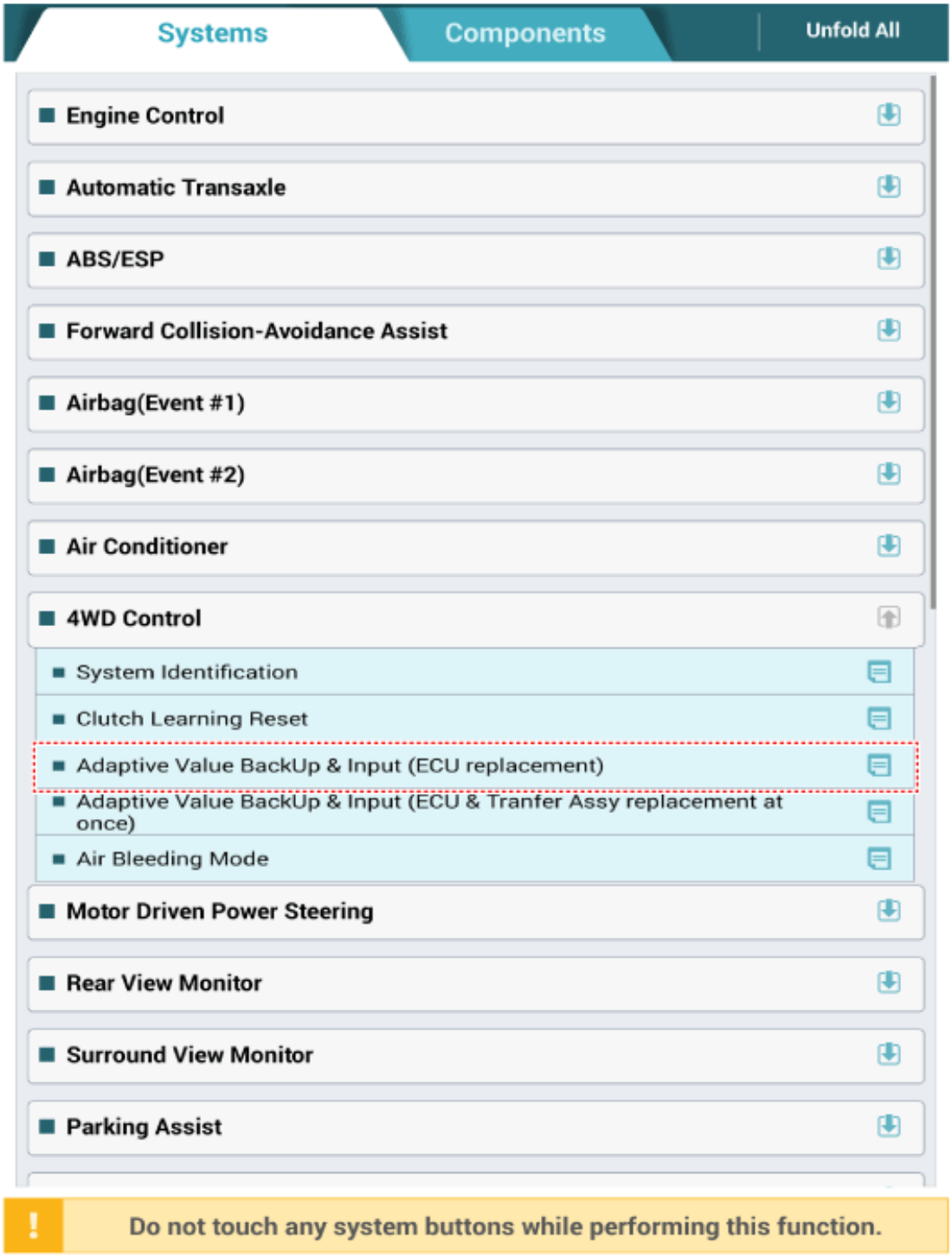
! Do not touch any system buttons while performing this function.


S/W Management
Clutch Learning Reset
[Clutch Learning Reset]
This is a function to reset the learned driven value into 4WD ECU after replacing 4WD coupling Assy'.
[Condition] Ignition ON/Engine OFF
If it is ready, Press [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Clutch Learning Reset
[Clutch Learning Reset]
This is a function to reset the learned driven value into 4WD ECU after replacing 4WD coupling Assy'.
[Condition] Ignition ON/Engine OFF
Information
Complete !!!
Turn IG off for 10 seconds and then back on.
Click the [OK] button to continue.
OK
OK
Cancel
Do not touch any system buttons while performing this function.

2) Replacement of AWD ECU (Controller) only

Before replacement: Check the ECU's clutch learning.


Systems
Components
Unfold All
Engine Control
Automatic Transaxle
ABS/ESP
Forward Collision-Avoidance Assist
Airbag(Event #1)
Airbag(Event #2)
Air Conditioner
4WD Control
System Identification
Clutch Learning Reset
Adaptive Value BackUp & Input (ECU replacement)
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
Air Bleeding Mode
Motor Driven Power Steering
Rear View Monitor
Surround View Monitor
Parking Assist
Do not touch any system buttons while performing this function.

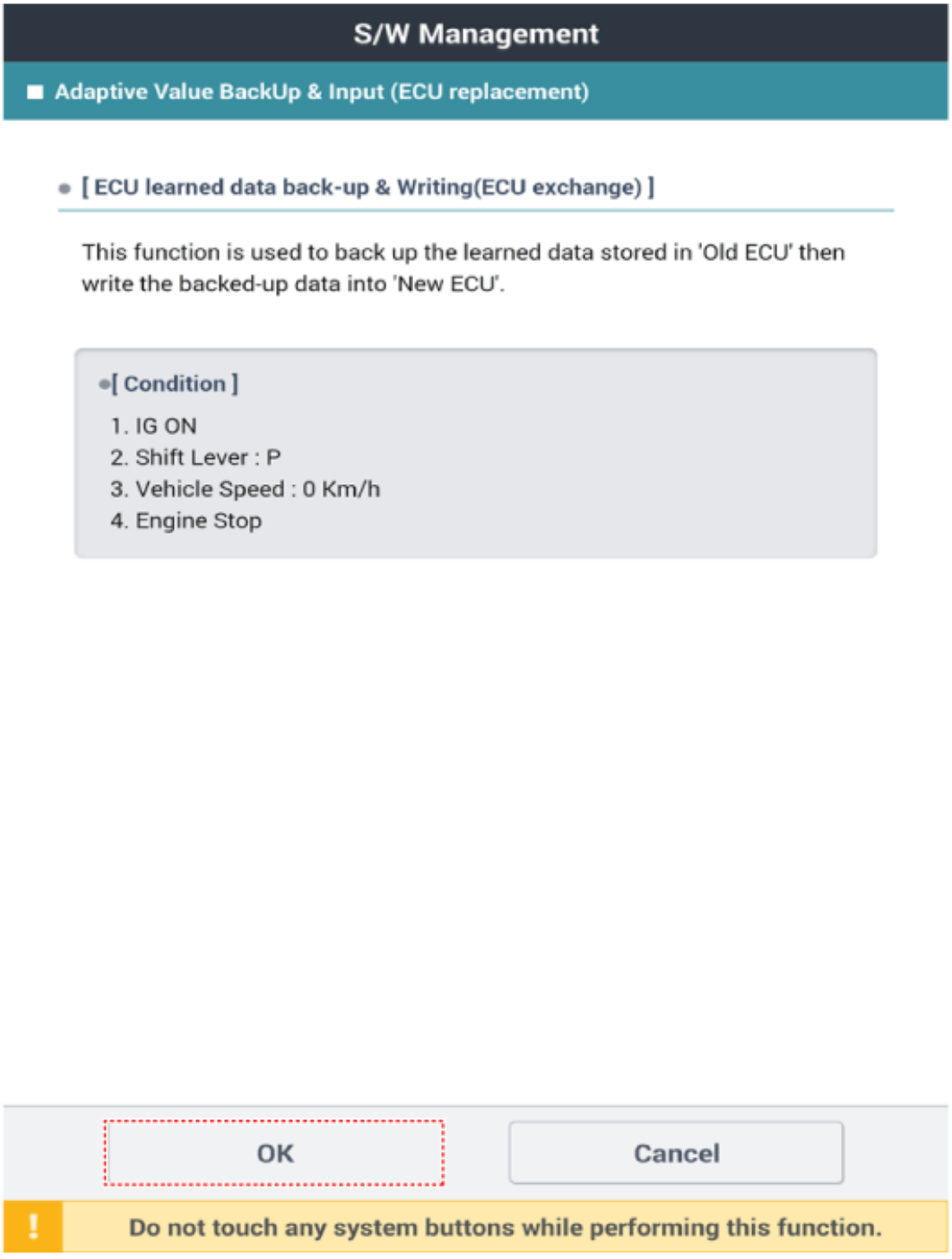
S/W Management

• ECU Data Back-up & Writing

Purpose	To back up the adaptive data stored in old ECU, and write the backed-up data into new ECU.
Enable Condition	1. Engine Off 2. Ignition Switch On 3. Shift Lever P 4. Vehicle speed : 0
Concerned Component	ECU
Concerned DTC	
Fail Safe	-
Etc	Procedure 1. Back Up(Back up data from the old ECU to the Diagnostic equipment) 2. Exchange the old ECU to the new ECU 3. Input(Input the backed up data to the new ECU using Diagnostic equipment)

OK

! Do not touch any system buttons while performing this function.


S/W Management
■ Adaptive Value BackUp & Input (ECU replacement)
● [ECU learned data back-up & Writing(ECU exchange)]
This function is used to back up the learned data stored in 'Old ECU' then write the backed-up data into 'New ECU'.
●[Condition]
1. IG ON
2. Shift Lever : P
3. Vehicle Speed : 0 Km/h
4. Engine Stop
OK
Cancel
Do not touch any system buttons while performing this function.

S/W Management

■ Adaptive Value BackUp & Input (ECU replacement)

● [ECU Learned Data Back-up & Writing(ECU exchange)]

If you want to back up the learned data from 'Old ECU'.

Please click **[back-up]** button.

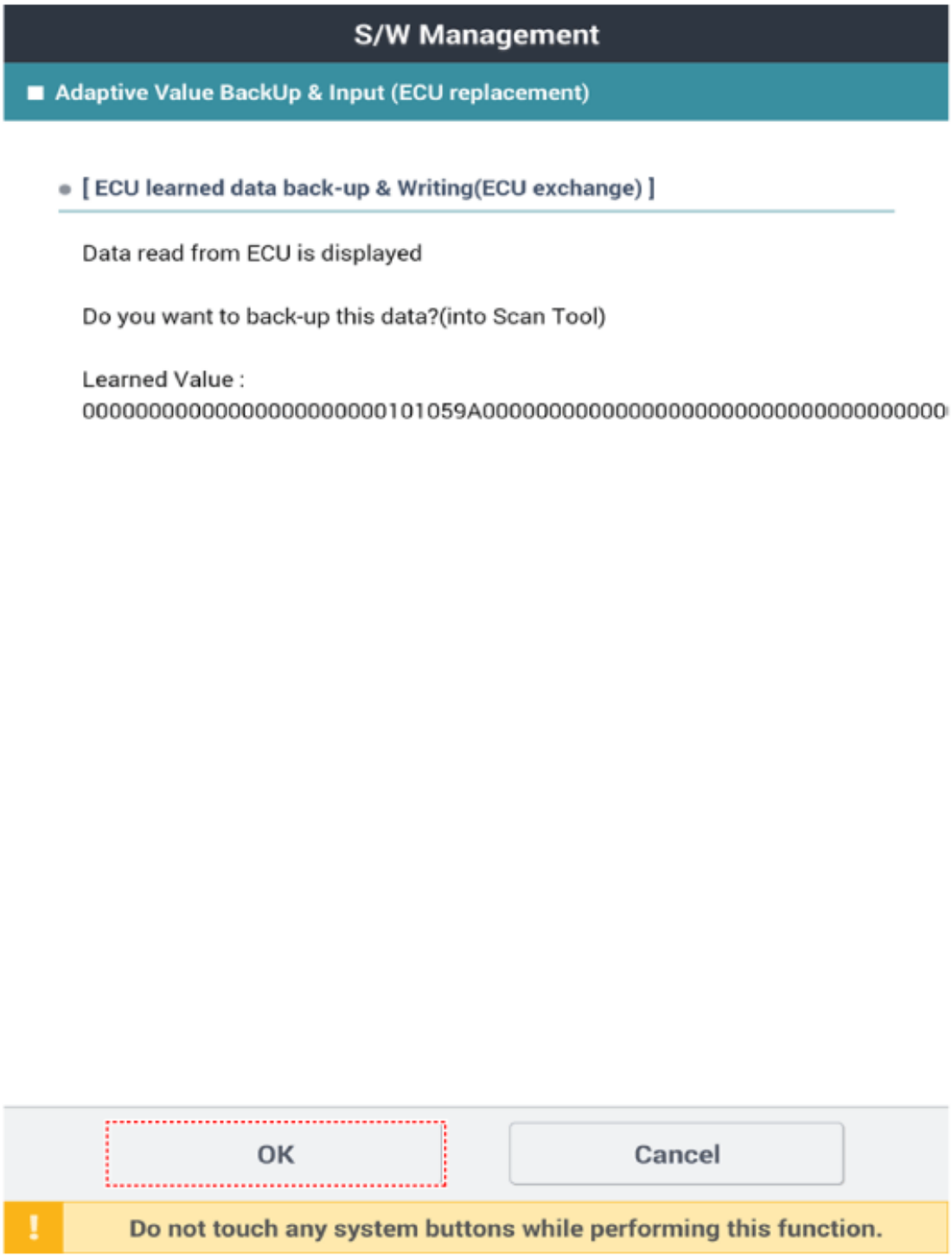
If you want to enter the 'backed-up' data to 'New ECU',

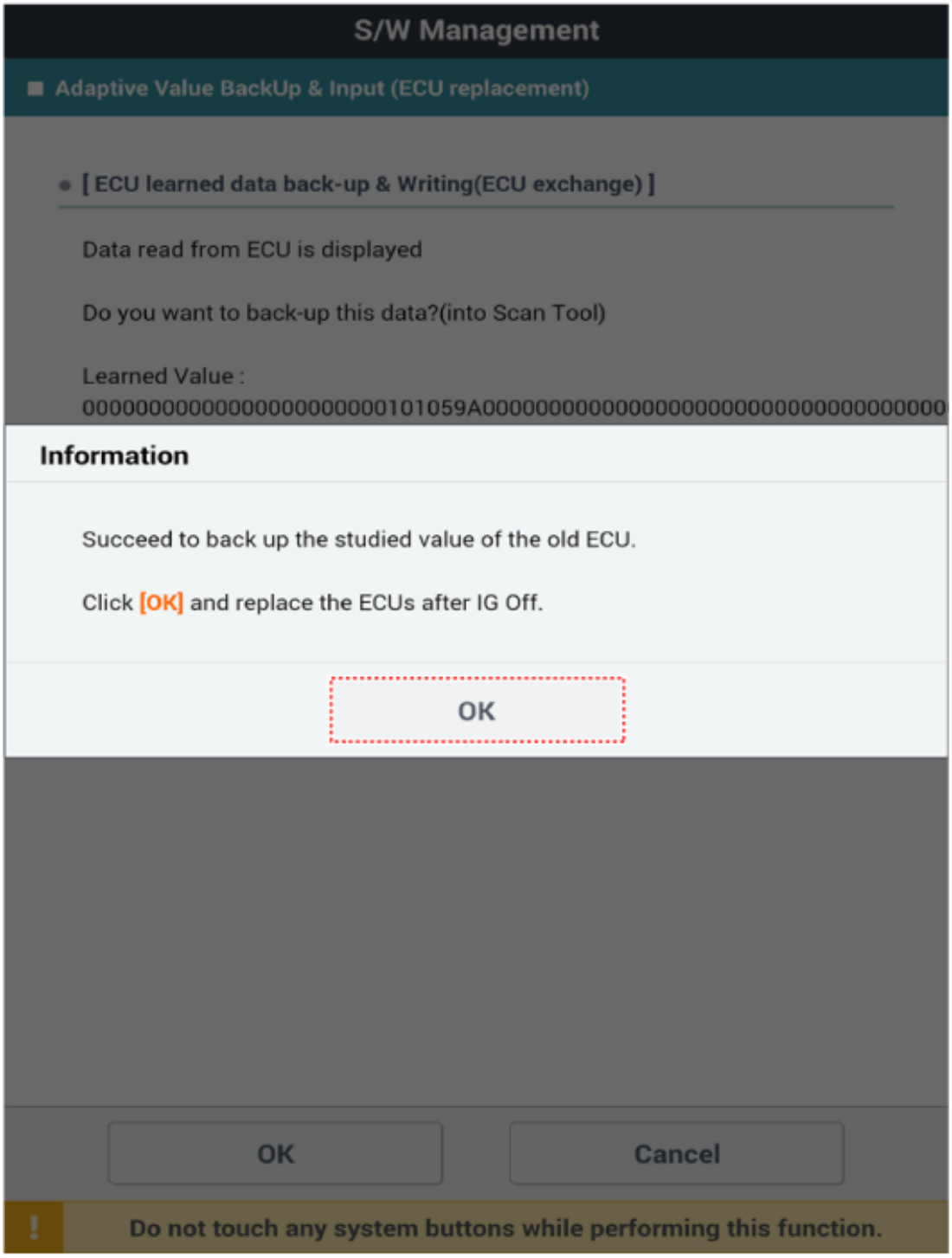
Please click **[Write]** button

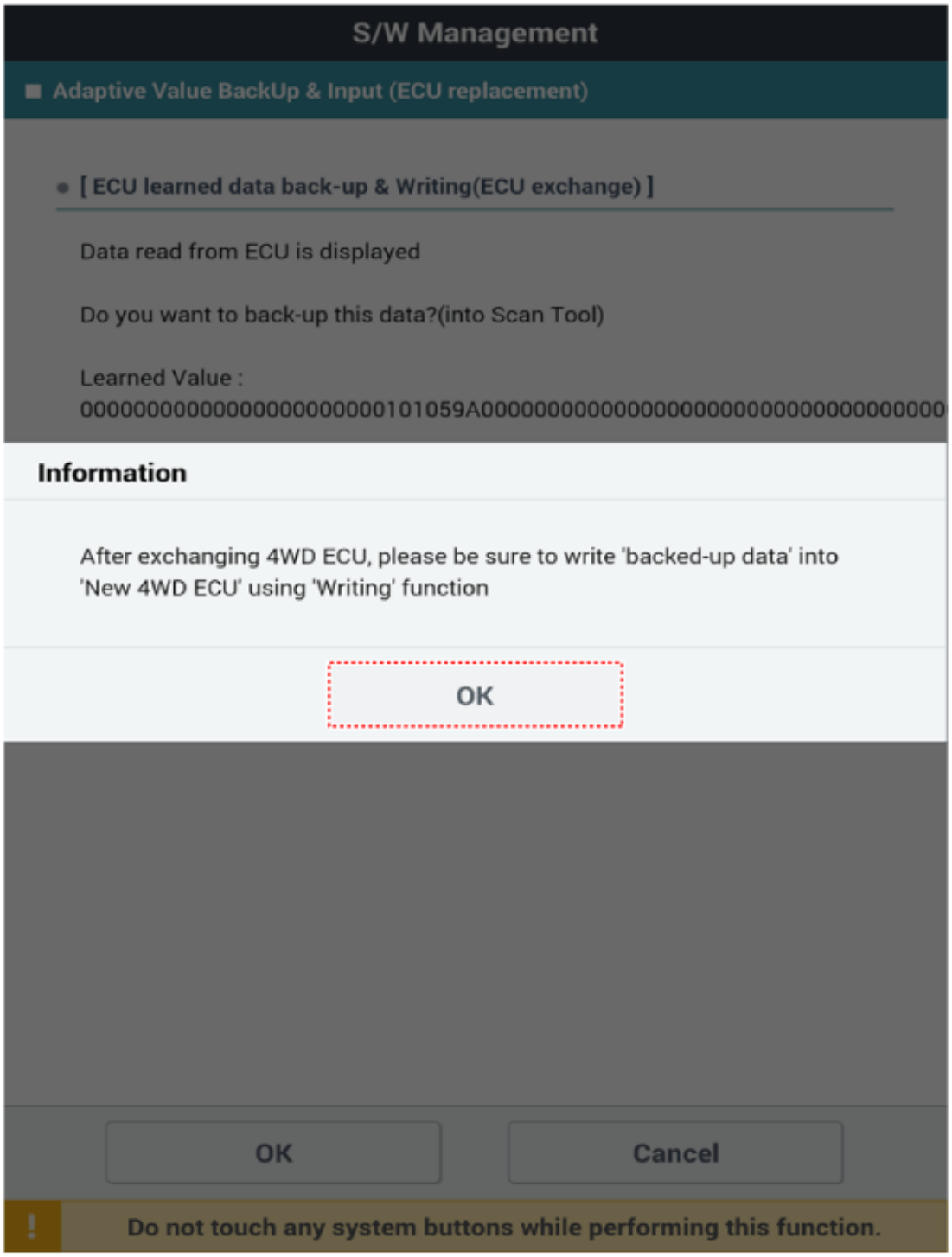
1. Back-up(Old ECU -> Scan Tool)
2. Exchange ECU
3. Write(Scan Tool -> New ECU)

BackUp | Write

! Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU replacement)
[ECU learned data back-up & Writing(ECU exchange)]
Data read from ECU is displayed
Do you want to back-up this data?(into Scan Tool)
Learned Value :
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU replacement)
[ECU learned data back-up & Writing(ECU exchange)]
Data read from ECU is displayed
Do you want to back-up this data?(into Scan Tool)
Learned Value :
Information
Succeed to back up the studied value of the old ECU.
Click [OK] and replace the ECUs after IG Off.
OK
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU replacement)
[ECU learned data back-up & Writing(ECU exchange)]
Data read from ECU is displayed
Do you want to back-up this data?(into Scan Tool)
Learned Value :
Information
After exchanging 4WD ECU, please be sure to write 'backed-up data' into 'New 4WD ECU' using 'Writing' function
OK
OK
Cancel
Do not touch any system buttons while performing this function.

S/W Management

■ Adaptive Value BackUp & Input (ECU replacement)

• [ECU Learned Data Back-up & Writing(ECU exchange)]

If you want to back up the learned data from 'Old ECU'.

Please click [back-up] button.

If you want to enter the 'backed-up' data to 'New ECU',

Please click [Write] button

1. Back-up(Old ECU -> Scan Tool)

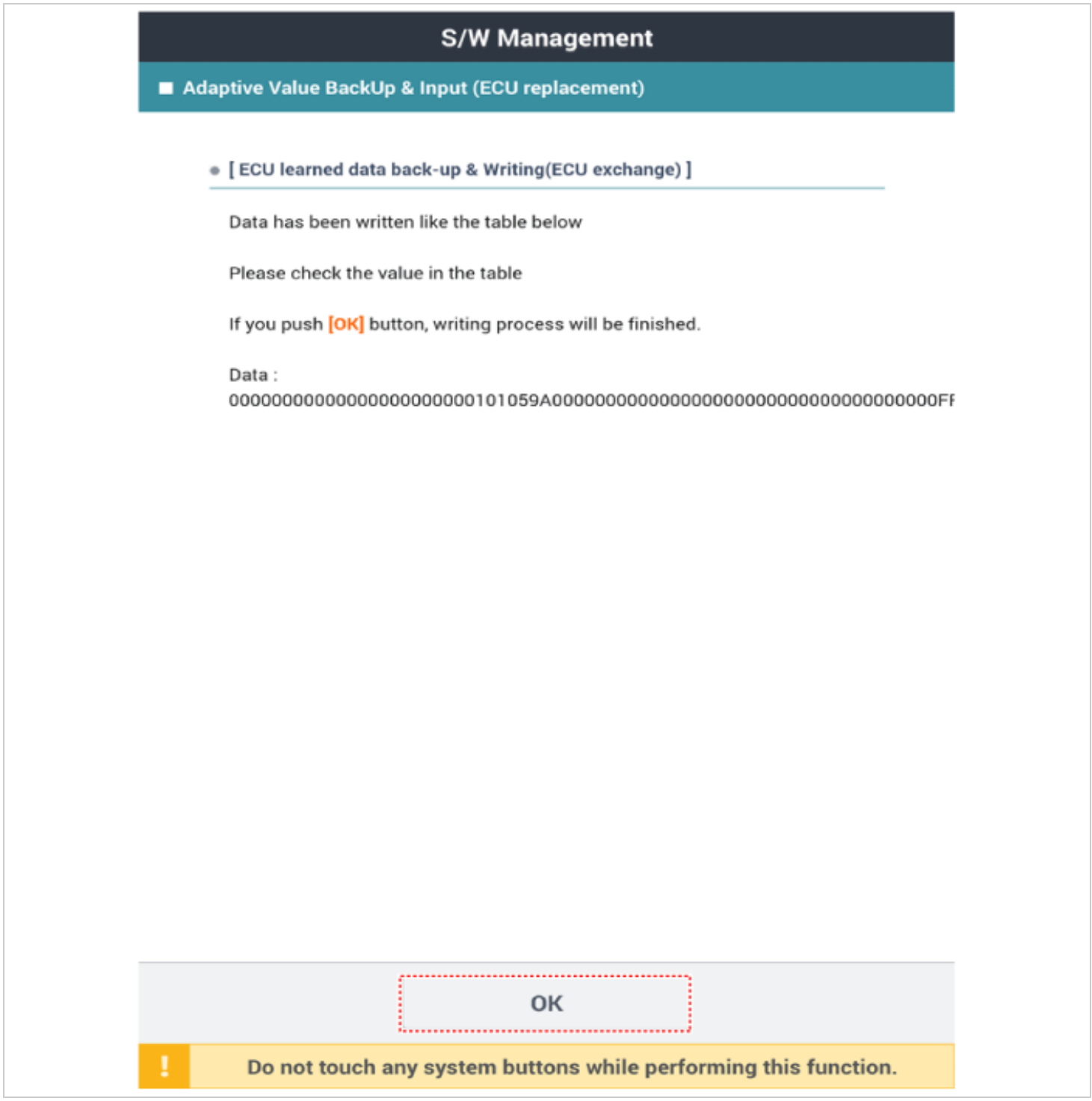
2. Exchange ECU

3. Write(Scan Tool -> New ECU)

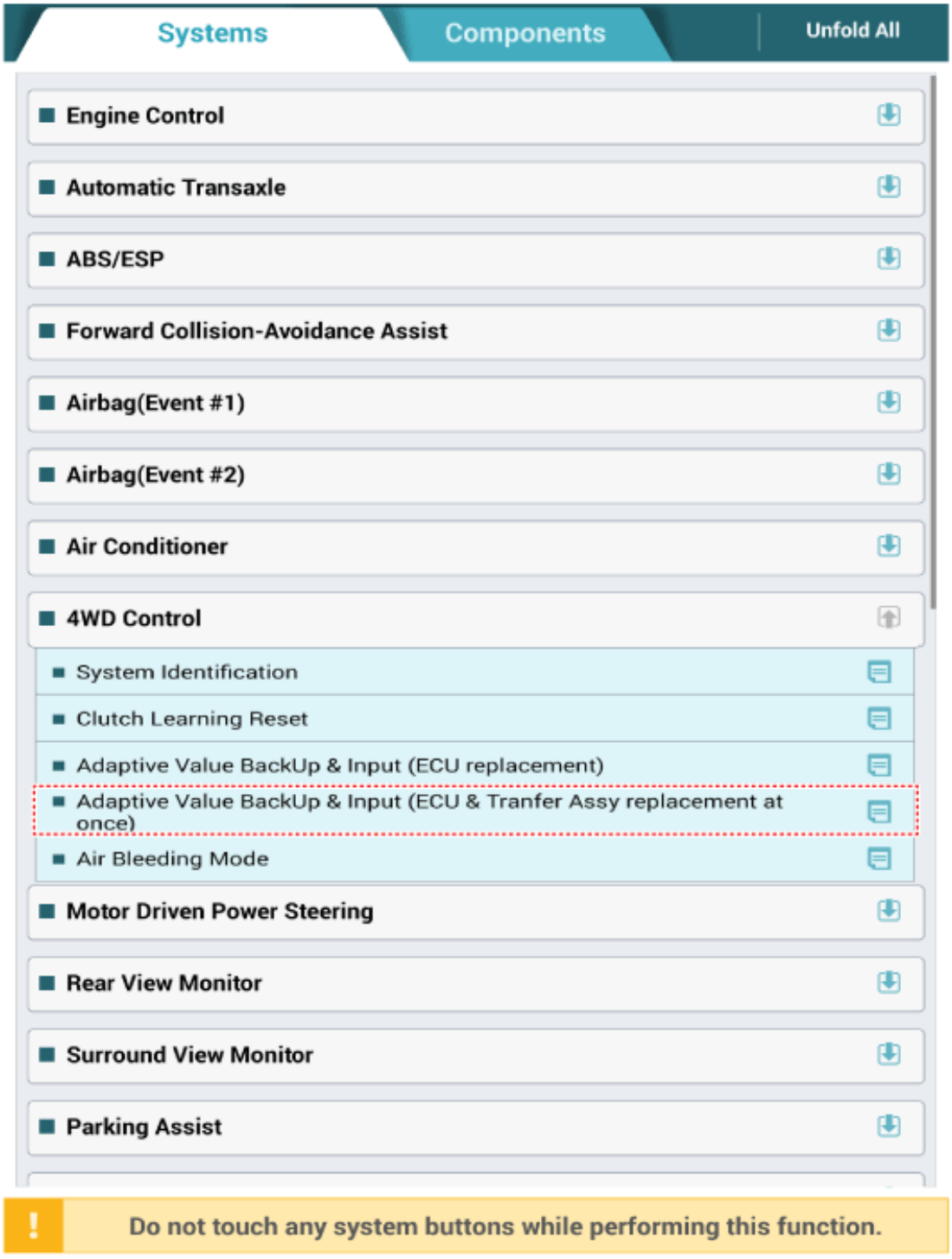
BackUp | Write

! Do not touch any system buttons while performing this function.

S/W Management
Adaptive Value BackUp & Input (ECU replacement)
[ECU learned data back-up & Writing(ECU exchange)]
The displayed data below is the data backed-up from 'Old ECU'.
If you want to write this data into 'New ECU', please push [OK] button.
Data :
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU replacement)
[ECU learned data back-up & Writing(ECU exchange)]
Data has been written like the table below
Please check the value in the table
If you push [OK] button, writing process will be finished.
Data :
OK
Do not touch any system buttons while performing this function.

3) After replacement: Enter the original ECU's clutch learning into the replacement ECU.


Systems
Components
Unfold All
Engine Control
Automatic Transaxle
ABS/ESP
Forward Collision-Avoidance Assist
Airbag(Event #1)
Airbag(Event #2)
Air Conditioner
4WD Control
System Identification
Clutch Learning Reset
Adaptive Value BackUp & Input (ECU replacement)
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
Air Bleeding Mode
Motor Driven Power Steering
Rear View Monitor
Surround View Monitor
Parking Assist
Do not touch any system buttons while performing this function.

S/W Management

■ Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)

• [Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]

This function is used to back up the learned data stored in 'Old ECU' then write the backed-up data into 'New ECU'.

•[Condition]

1. IG ON
2. Shift Lever : P
3. Vehicle Speed : 0 Km/h
4. Engine Stop

OK Cancel

! Do not touch any system buttons while performing this function.

S/W Management

■ Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)

• [Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]

If you want to back up the learned data from 'Old ECU'.

Please click [back-up] button.

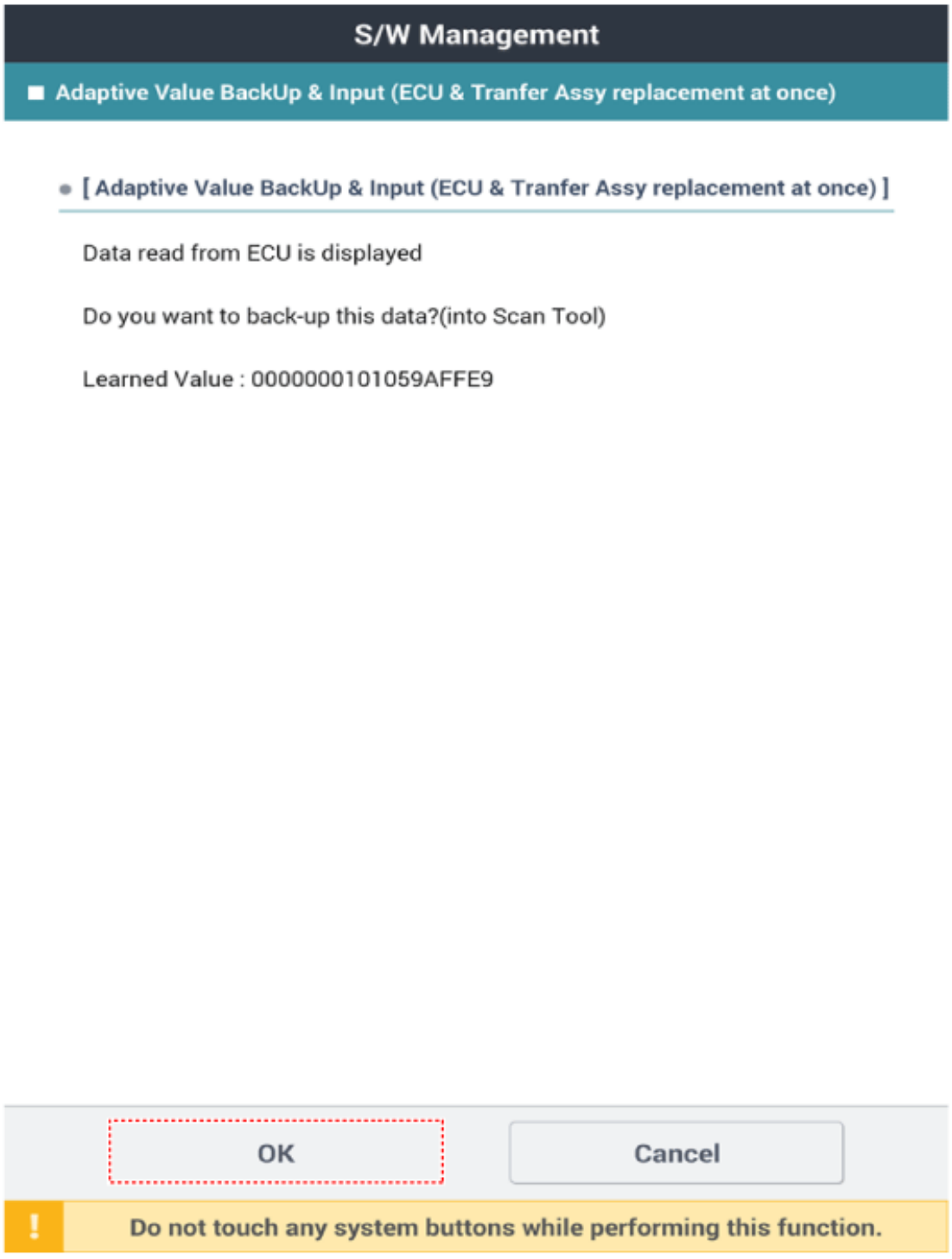
If you want to enter the 'backed-up' data to 'New ECU',

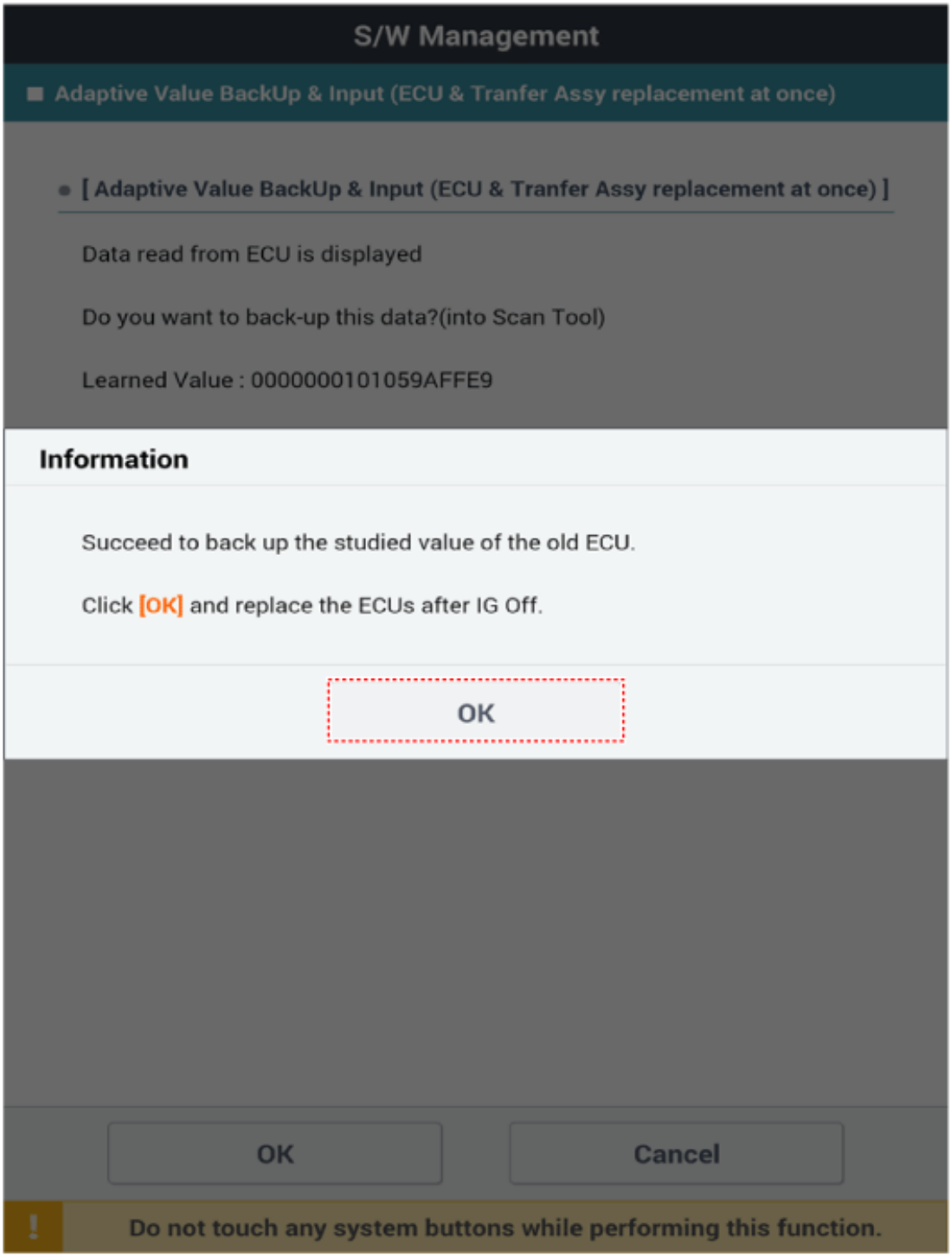
Please click [Write] button

1. Back-up(Old ECU -> Scan Tool)
2. Exchange ECU
3. Write(Scan Tool -> New ECU)

BackUp | Write

! Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
[Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]
Data read from ECU is displayed
Do you want to back-up this data?(into Scan Tool)
Learned Value : 0000000101059AFFE9
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
[Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]
Data read from ECU is displayed
Do you want to back-up this data?(into Scan Tool)
Learned Value : 0000000101059AFFE9
Information
Succeed to back up the studied value of the old ECU.
Click [OK] and replace the ECUs after IG Off.
OK
OK
Cancel
Do not touch any system buttons while performing this function.

S/W Management

■ Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)

• [Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]

If you want to back up the learned data from 'Old ECU'.

Please click [back-up] button.

If you want to enter the 'backed-up' data to 'New ECU',

Please click [Write] button

1. Back-up(Old ECU -> Scan Tool)

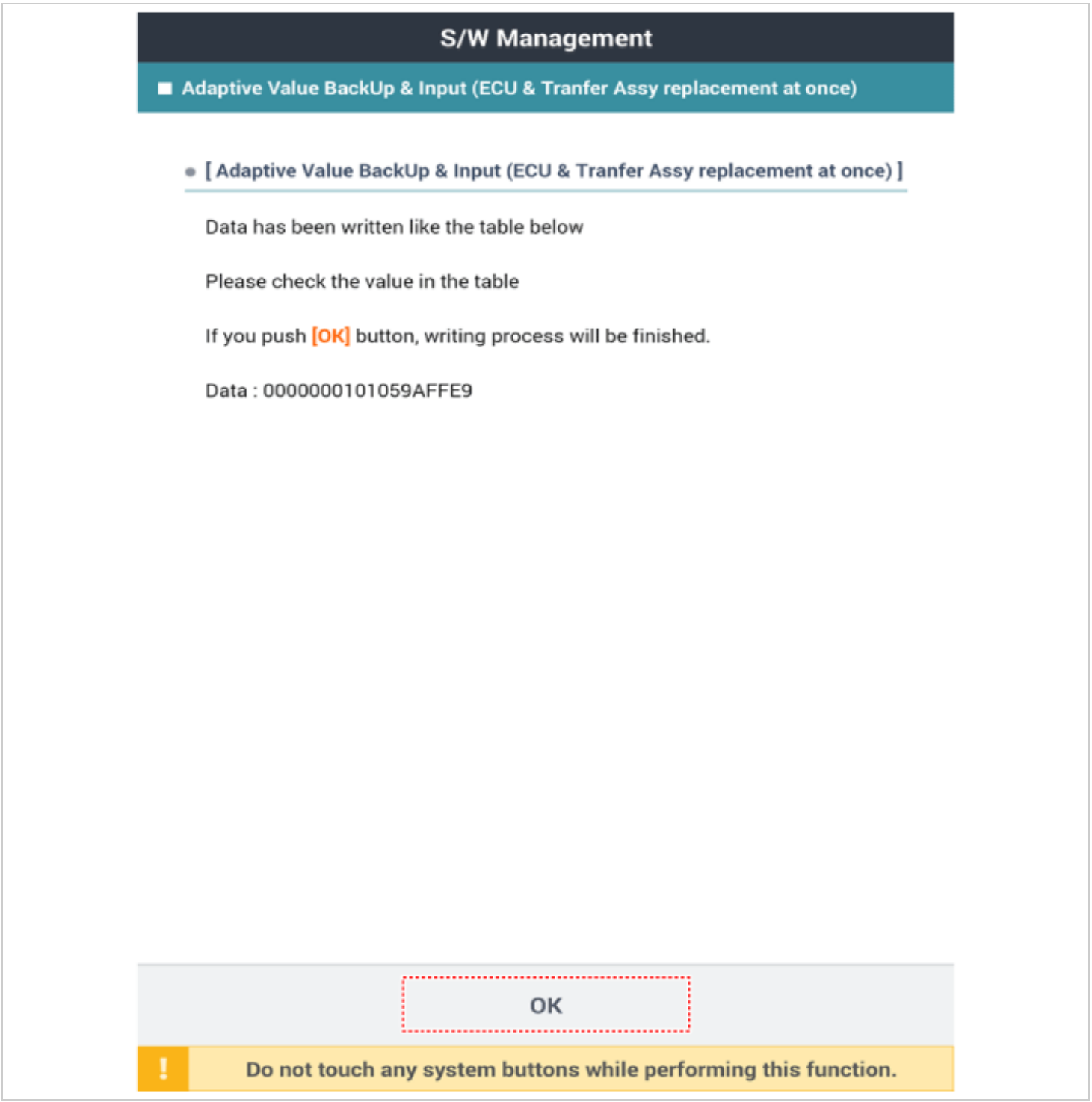
2. Exchange ECU

3. Write(Scan Tool -> New ECU)

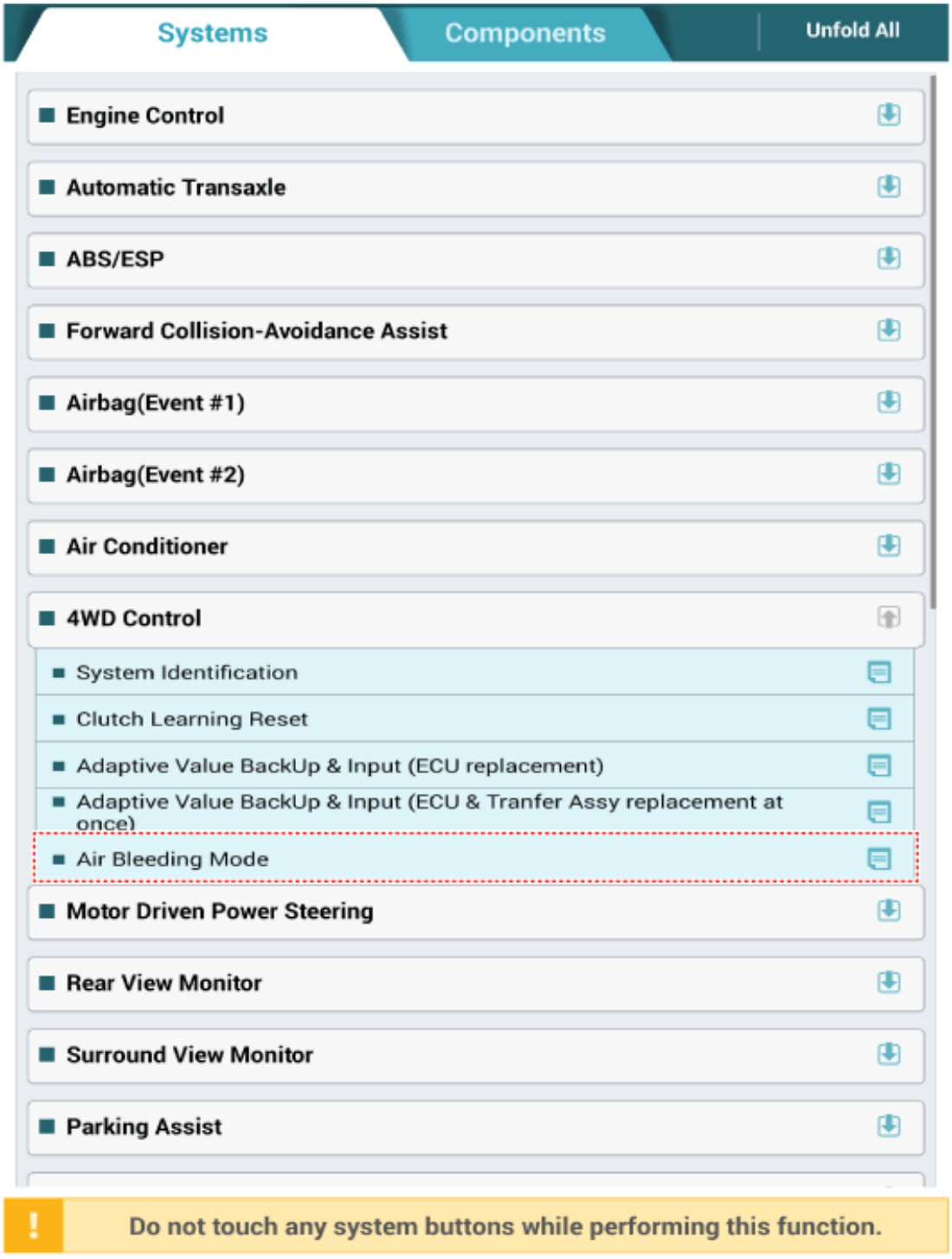
BackUp | Write

! Do not touch any system buttons while performing this function.

S/W Management
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
[Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]
The displayed data below is the data backed-up from 'Old ECU'.
If you want to write this data into 'New ECU', please push [OK] button.
Data : 0000000101059AFFE9
OK
Cancel
Do not touch any system buttons while performing this function.


S/W Management
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
[Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)]
Data has been written like the table below
Please check the value in the table
If you push [OK] button, writing process will be finished.
Data : 0000000101059AFFE9
OK
Do not touch any system buttons while performing this function.

4) Perform the following procedure in case of the appearance of failure code (P182900, P183600).


Systems
Components
Unfold All
Engine Control
Automatic Transaxle
ABS/ESP
Forward Collision-Avoidance Assist
Airbag(Event #1)
Airbag(Event #2)
Air Conditioner
4WD Control
System Identification
Clutch Learning Reset
Adaptive Value BackUp & Input (ECU replacement)
Adaptive Value BackUp & Input (ECU & Tranfer Assy replacement at once)
Air Bleeding Mode
Motor Driven Power Steering
Rear View Monitor
Surround View Monitor
Parking Assist
Do not touch any system buttons while performing this function.

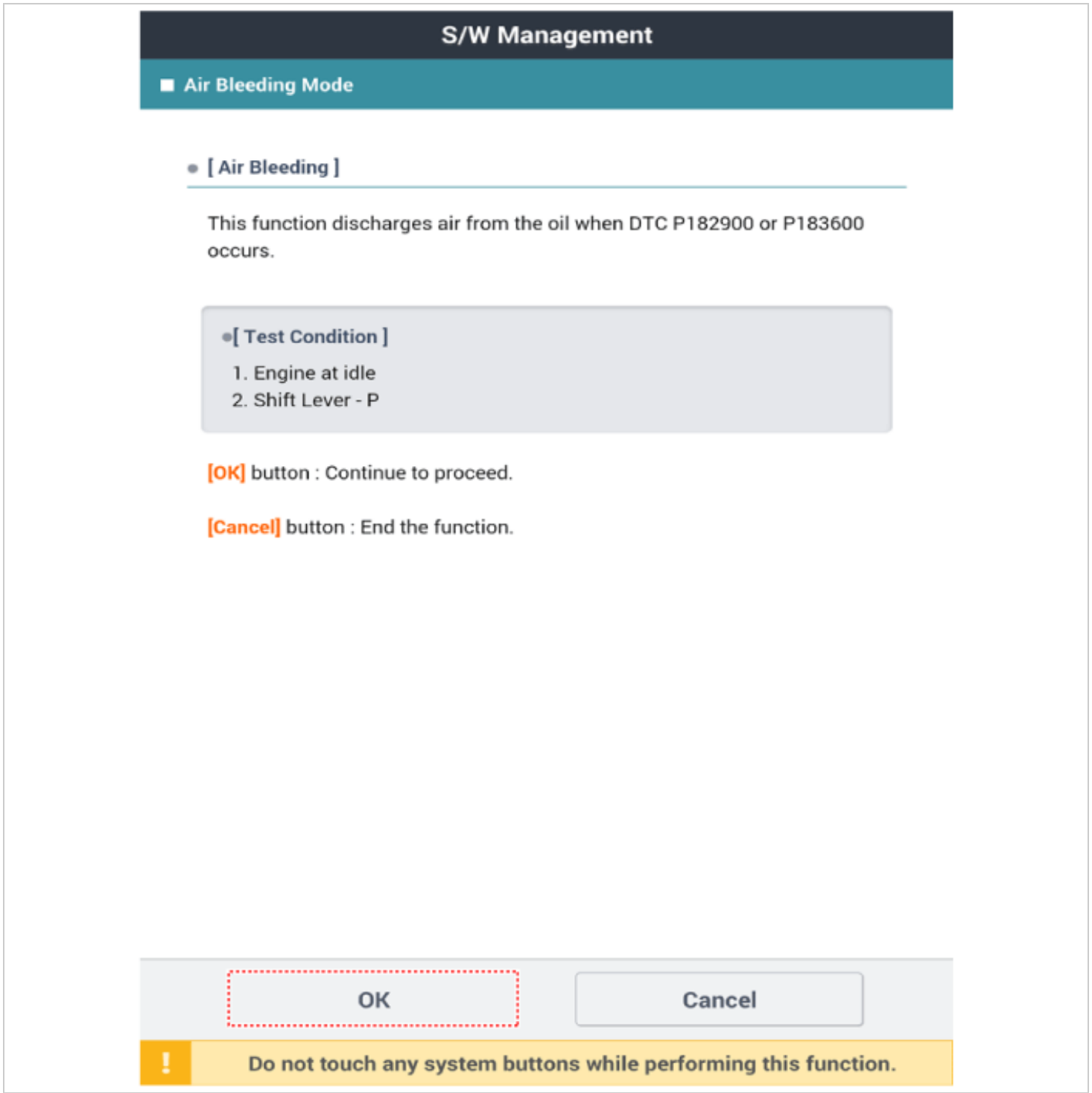
S/W Management

• Air Bleeding Mode

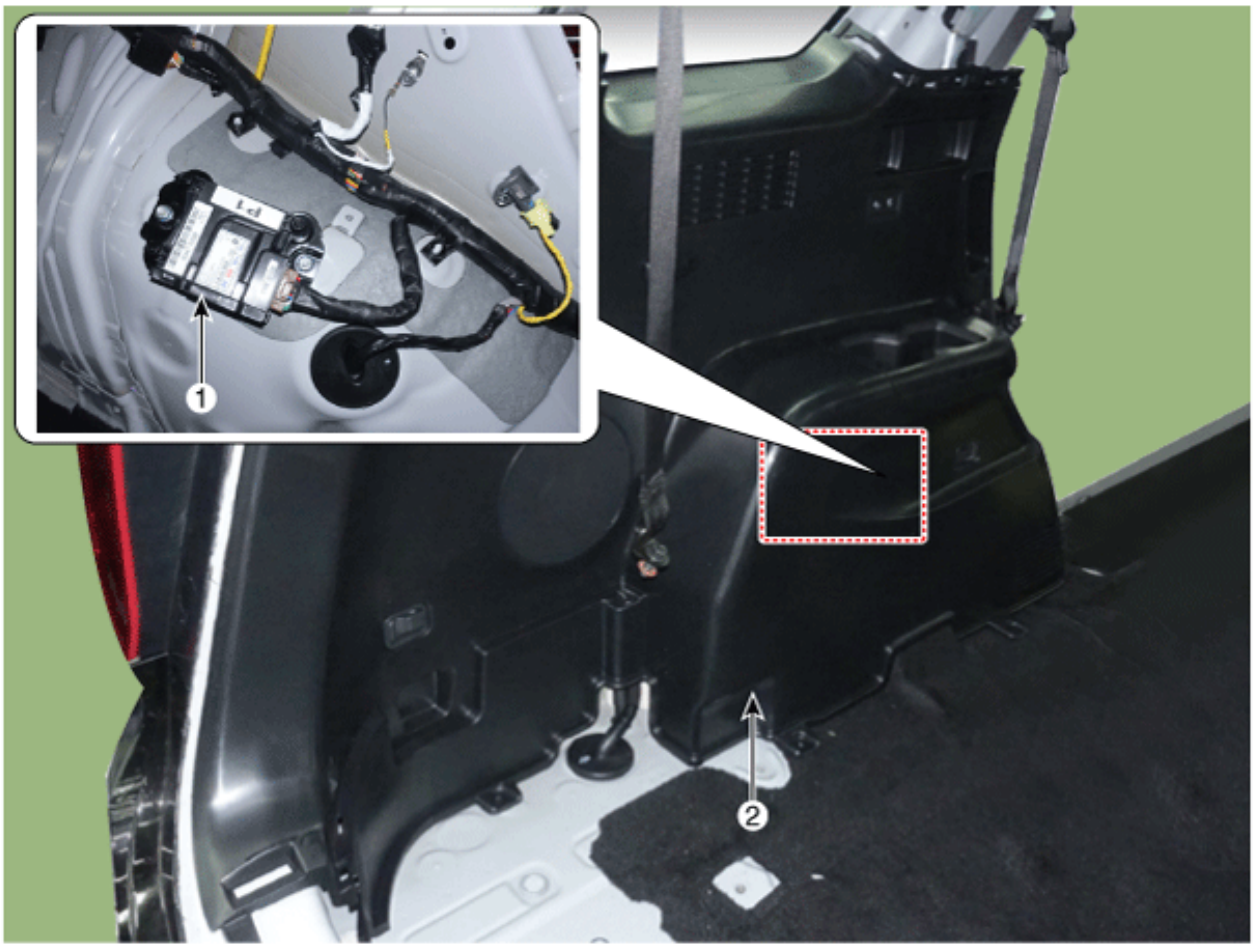
Purpose	This function discharges air from the oil when DTC P182900 or P183600 occurs.
Enable Condition	I. Engine Idle 2. Shift lever: P
Concerned Component	-
Concerned DTC	P182900, P183600
Fail Safe	-
Etc	-

OK

! Do not touch any system buttons while performing this function.


S/W Management
Air Bleeding Mode
[Air Bleeding]
This function discharges air from the oil when DTC P182900 or P183600 occurs.
[Test Condition]
1. Engine at idle
2. Shift Lever - P
[OK] button : Continue to proceed.
[Cancel] button : End the function.
OK
Cancel
Do not touch any system buttons while performing this function.

- Components Location

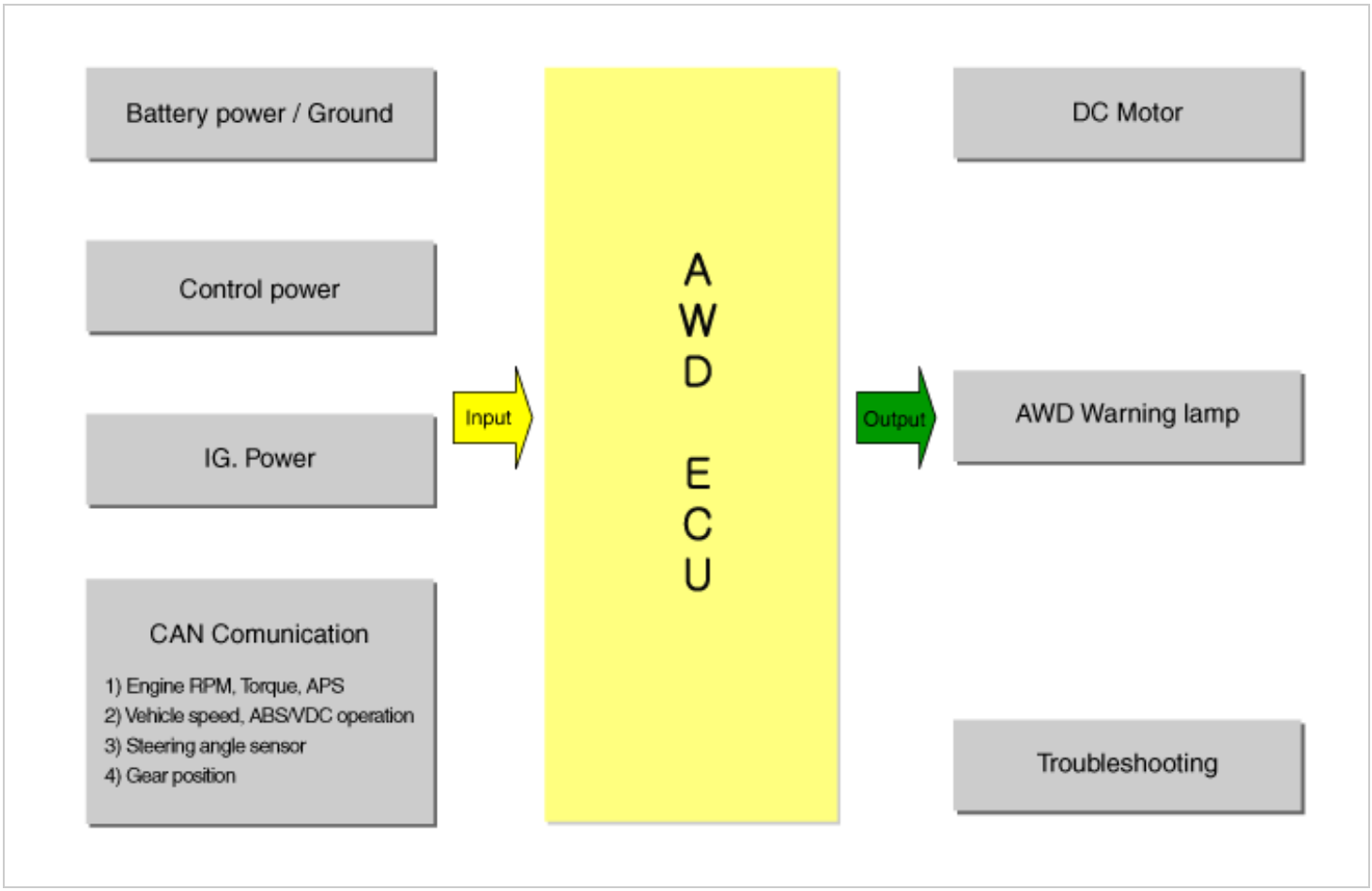


1. AWD ECU
2. Luggage side trim**[Left side]**

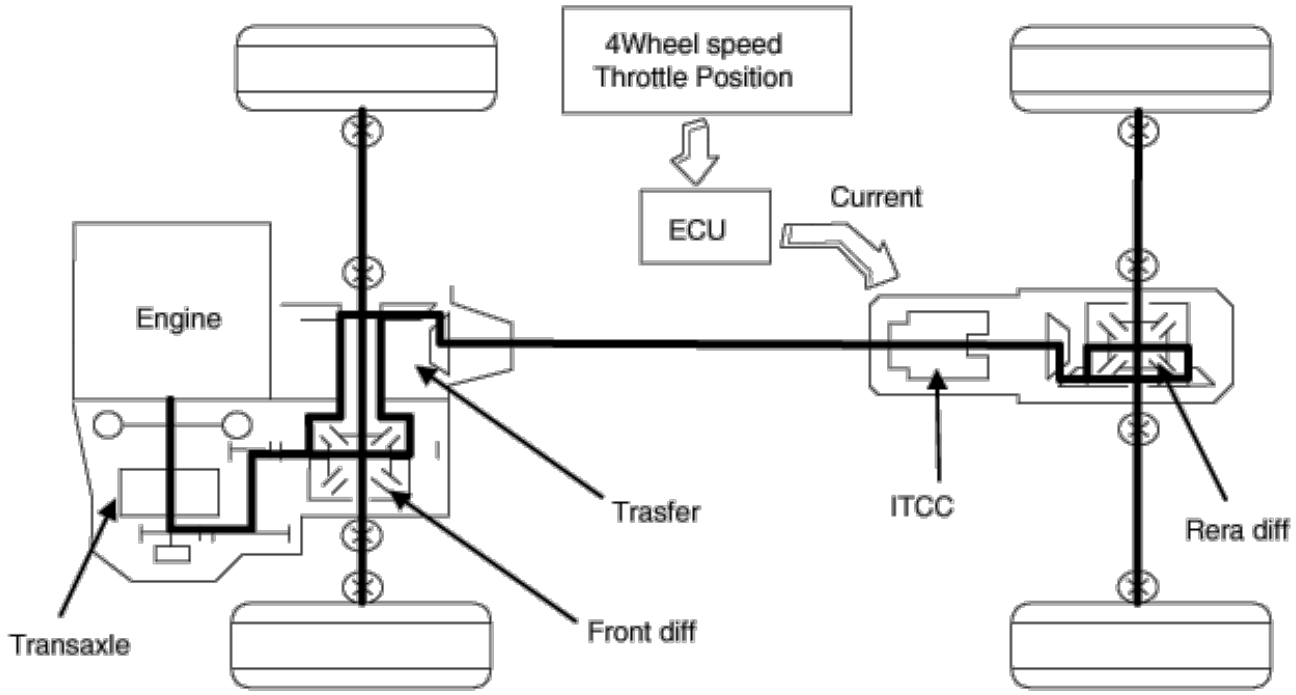
- Description

The AWD ECU distributes the driving force to the front/rear wheel through controlling the multi plate clutch on the AWD transfer case by analyzing the input information, i.e. the wheel speed, accelerator and steering angle depending on the road condition and driving state. The AWD vehicle has different power transmitting conditions depending on the driving/road conditions. The vehicle speed is transmitted through CAN communication from ABS/ESP ECU.

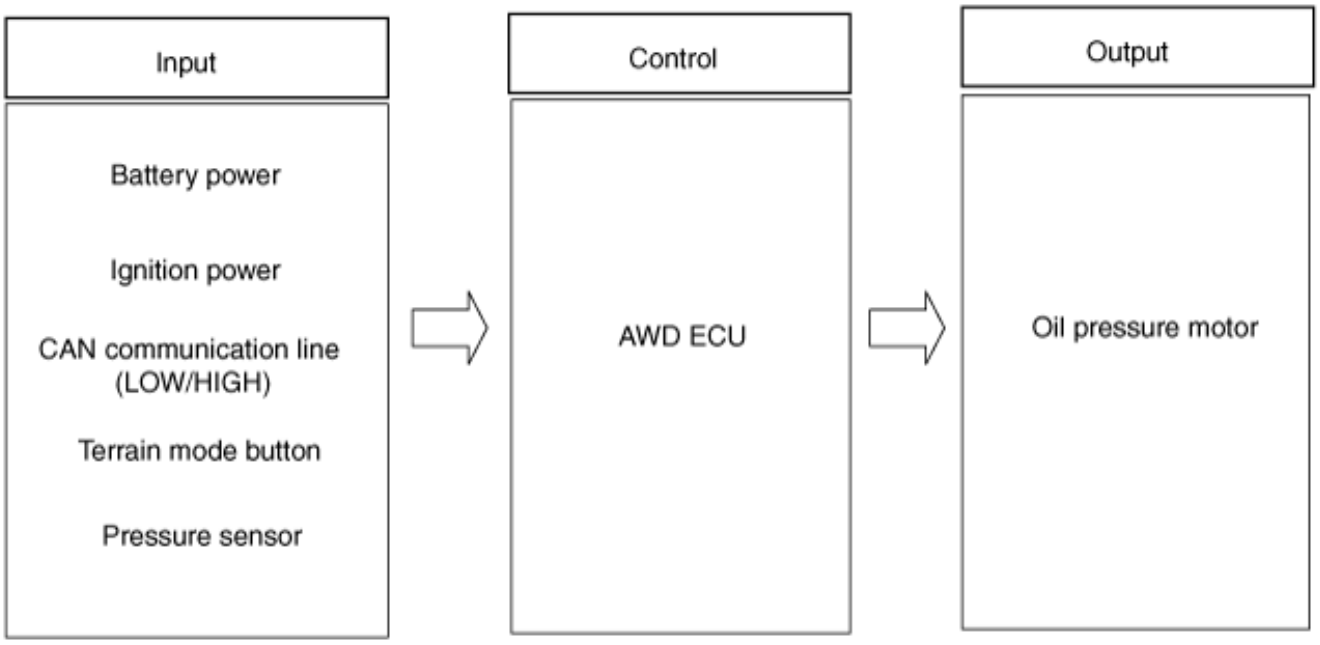
The information from the CAN communication includes the APS which indicates the driver’s intention of acceleration, engine torque, ABS/ESP operation signal and gear position. The AWD ECU controls the BLDC motor, warning lamp and indicating lamp and communicates with the tester equipment. When a vehicle runs at normal speed higher than 60KPH on regular roads, it is controlled under the 2WD conditions. The ECU decides the driving force on the front and rear wheel by receiving the signals from all sensors depending on the driving conditions, i.e. abrupt starting, turning and driving on the low friction road, and the optimized torque which is proper to the driving condition is transmitted to the front wheel through calculating and controlling the transmitted torque data.



- Power Flow Diagram

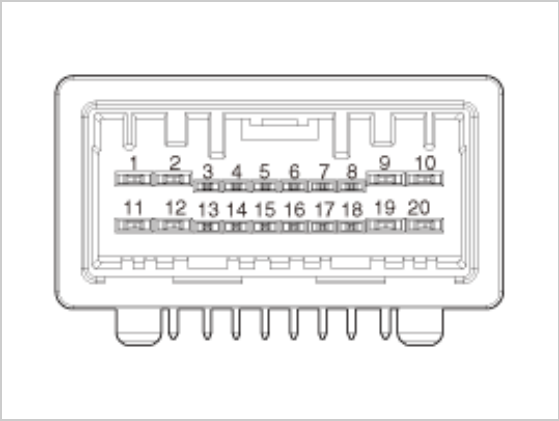


- AWD ECU Input&Output Diagram



- Circuit Diagram

AWD ECU Connector



AWD ECU Pin Function

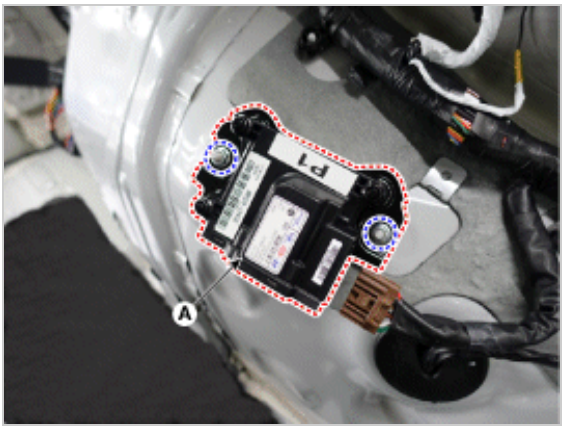
Pin	Function
1	Motor B
2	Motor A
3	-
4	-
5	Pressure sensor supply
6	-
7	IG1
8	Motor shield wire ground
9	Battery ground
10	Battery supply
11	-
12	-
13	-
14	Pressure sensor signal
15	Pressure sensor ground
16	-
17	CAN HIGH
18	CAN LOW
19	-
20	-

- Removal

1. Prior to replacing the AWD ECU, check the AWD ECU's clutch learing with the diagnotic tool.
   (Refer to AWD Control System - "Repair Procedures")
2. Turn ignition switch OFF and disconnect the negative (-) battery cable.
3. Remove the left side luggage side trim.
   (Refer to Body - "Interior Trim")
4. Disconnect the AWD ECU connector (A).

5. Loosen the mounting nuts and then removing the AWD ECU (A).

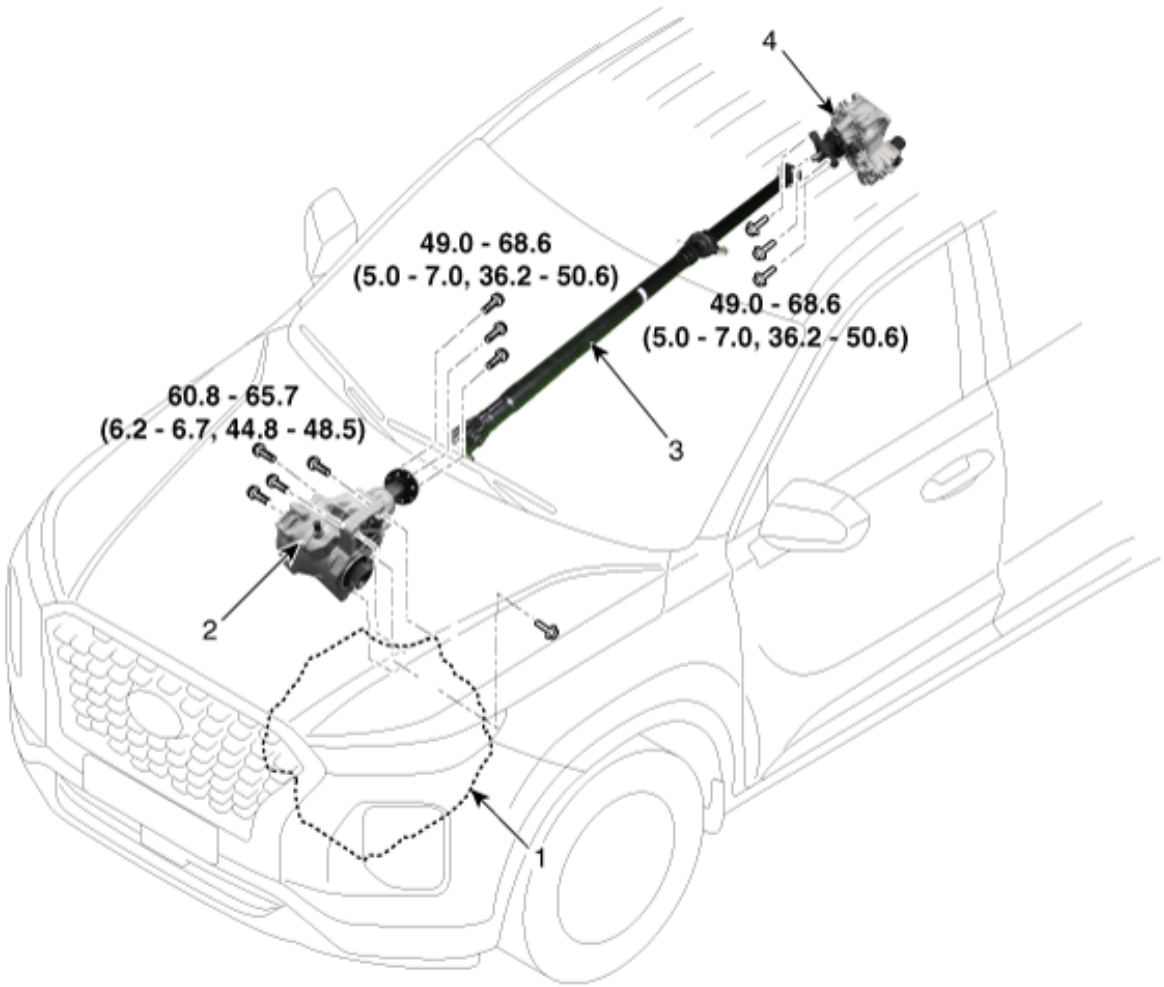
Tightening torque:
9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



- Installation

1. To install, reverse the removal procedures.
2. Prior to installing a new ECU, upload the original ECU’s clutch learing to the replacement ECU using the diagnotic tool. (Refer to AWD Control System - "Repair Procedures")

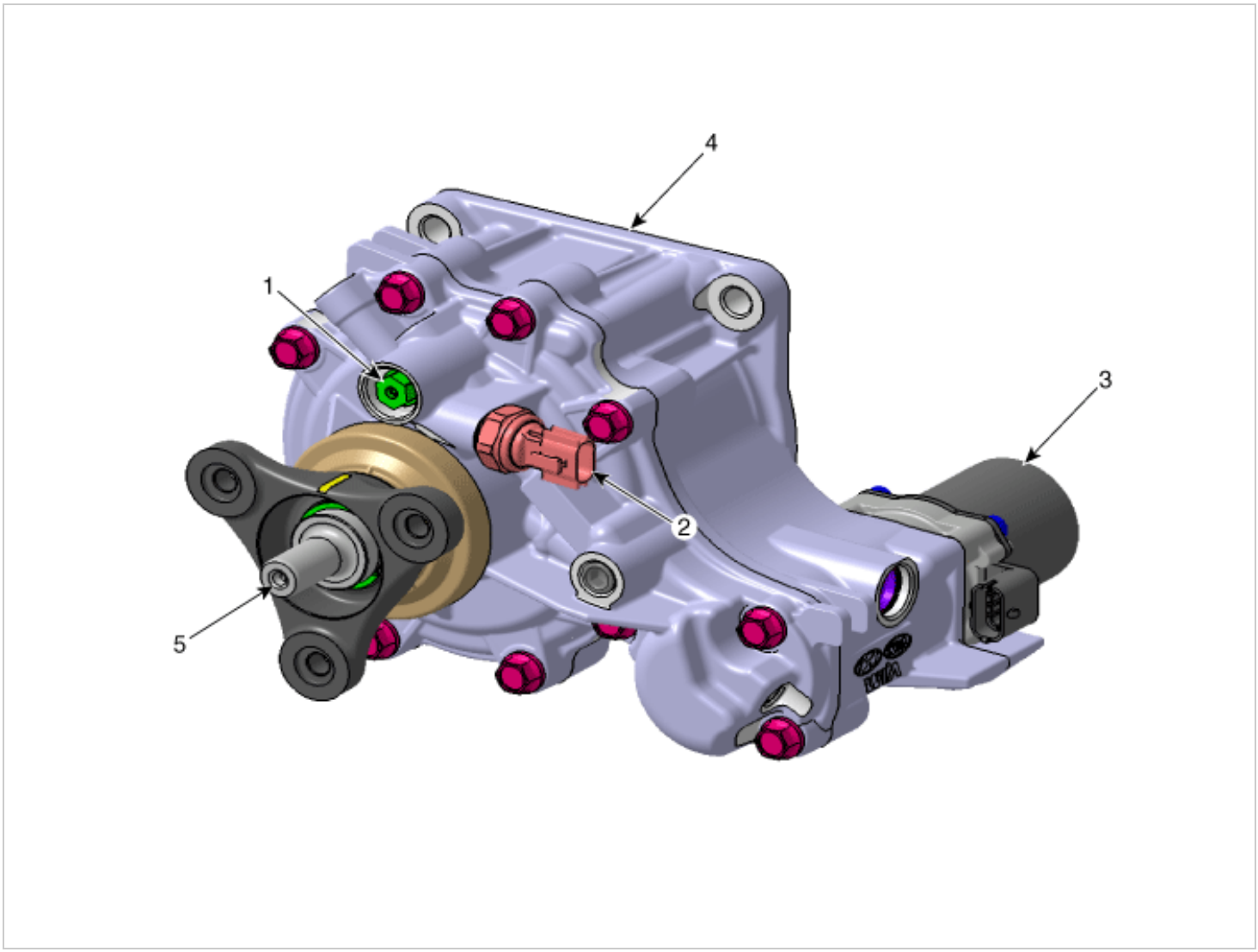
- Component Location



Tightening torque : N.m (kgf.m, lb-ft)

1. Trasaxle assembly
2. Transfer assembly
3. Propeller shaft assembly
4. Coupling assembly

- Components



1. Relief valve
2. Pressure sensor
3. Oil hydraulic motor
4. Coupling asesmbly
5. Input shaft

- Description

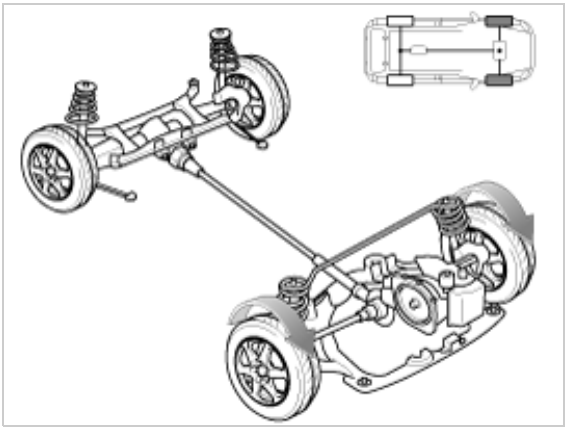
AWD ECU processes signals from various sensors and determines the current road and driving conditions. The ECU then utilizes this information to implement precision control over the AWD coupling's multi-plate clutch and variably adjust the amount of torque delivered tothe rear wheels.

AWD Driving mode

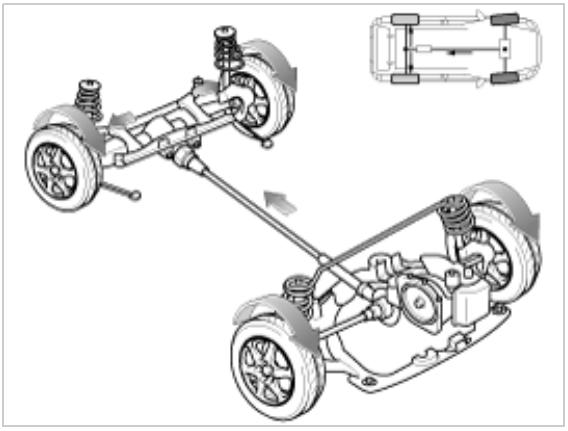
- Under the conditions requiring high driving power such as start/hill climbing/low speed, the front and rear power distribution rate is 5:5. Under the driving conditions which do not require driving power such as constant speed/deceleration, the vehicle operates automatically in 2WD (excluding SAND/MUD/SPORT)
- On the slippery road such as snowy/icy road, smooth escape performance is realized by automatically distributing the driving power.
- Based on the selected Terrain Mode, control is focused on driving stability and escape performance for SNOW and rough road driving performance is secured in SAND/MUD through high driving power and driving power distribution rate.

Electronic Coupling - AWD Control (By Driving Condition)

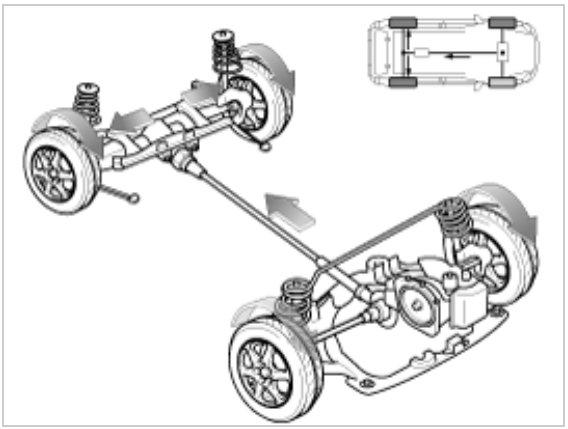
1. Driving conditions
   1) Cruising
      - Power is delivered mostly to the front wheels.
      Driving power distribution (front wheel 100%, rear wheel 0%)



   2) Cornering
      - Adjusts the amount of power to the rear wheels based on the turning radius and cornering speed.
      Driving power distribution (front wheel 80%, rear wheel 20% or front wheel\ 50%, rear wheel 50%)



   3) In case of start and rapid acceleration
      - Steady driving power is delivered to the front and rear wheels in case of start and rapid acceleration
      Driving power distribution (front wheel 50%, rear wheel 50% or front wheel 60%, rear wheel 40%)



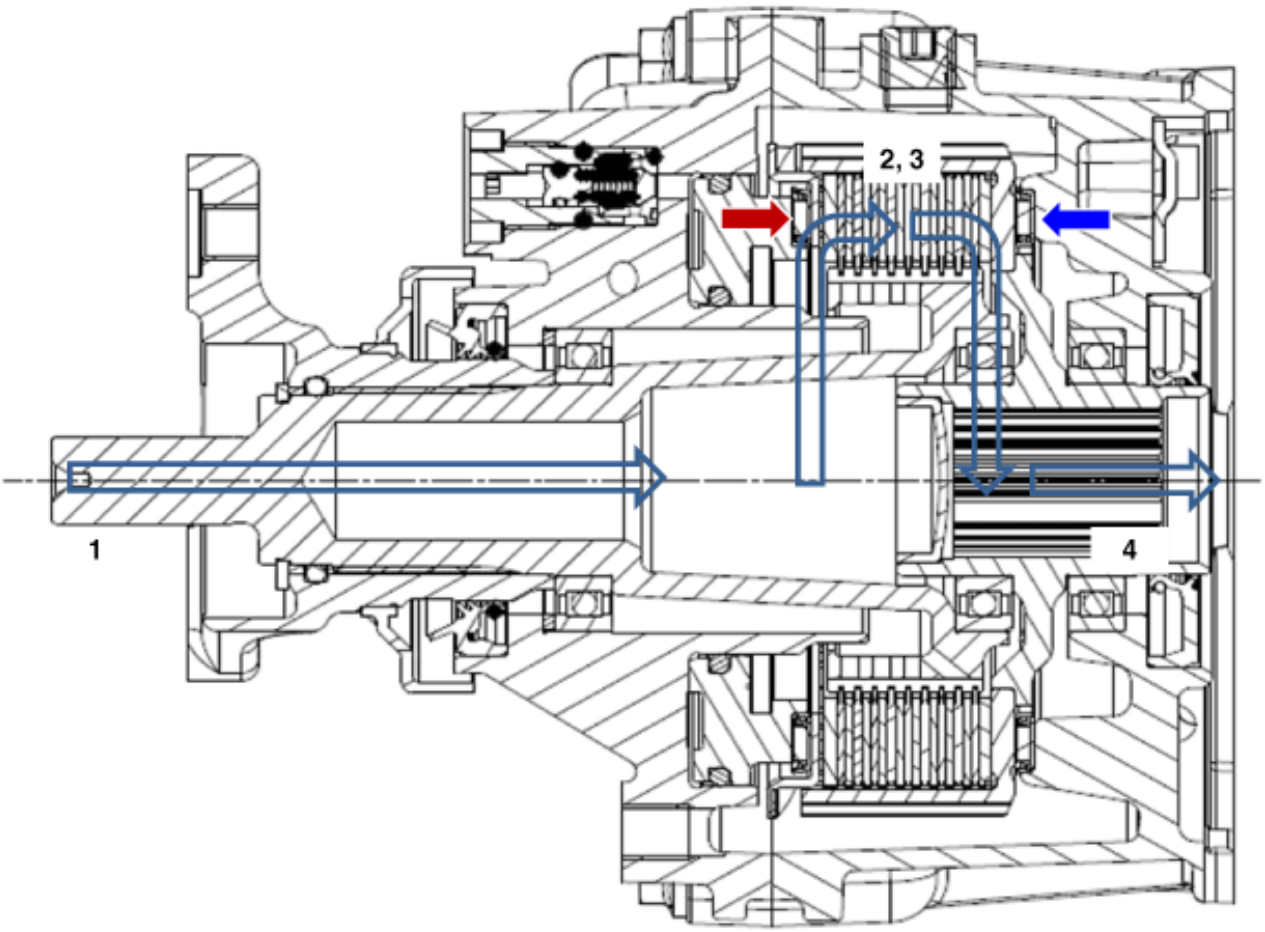
2. Terrain mode
   1) When driving on snowy road (slippery and even road surface)
      - Safety-centered low power driving
      Driving power distribution (front wheel 50%, rear wheel 50%)

2) When driving on sandy road (road surface with high driving resistance)
   - High power driving
   Driving power distribution (front wheel 50%, rear wheel 50%)

3) When driving on muddy road (slippery and uneven road surface)
   - Escape performance and running stability
   Driving power distribution (front wheel 50%, rear wheel 50%)

- Operation

Electronic Coupling



1. The power is delivered in the following order:
   Transmission -> Transfer -> Propeller shaft
2. AWD ECU calculates the necessary amount of rear-wheel torque and sends the corresponding driving current to the actuator (electronic motor and hydraulic pump).
3. The piston operates by the oil pressure and the friction is generated. Then, the clutch is engaged.
4. The power is delivered to the differential by the engaged clutch and the driving power is generated in to the rear wheel.

- Inspection

NOTICE

- All units are filled up with coupling fluid (ultra-low viscosity ATF) prior to shipping. Inspection, fill-up, and replacement of coupling fluid is therefore not necessary (zero maintenance, lifetime fluid).

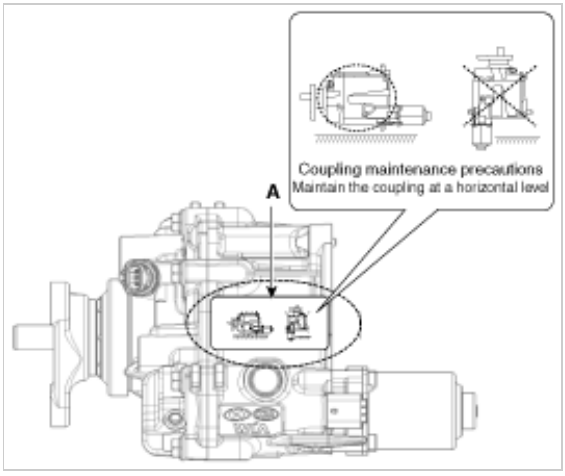
- Removal

NOTICE

Coupling Maintenance Precautions

Maintain the coupling at a horizontal level.

- Refer to the handling caution level (A) when servicing the coupling (removal, installation, replacement, etc.).



- Always maintain a horizontal posture.

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

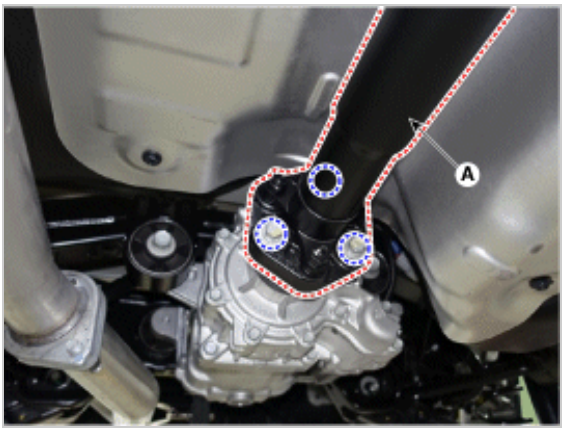
1. Loosen the rear propeller shaft assembly mounting bolts and then removing the rear propeller shaft assembly (A).

Tightening torque :

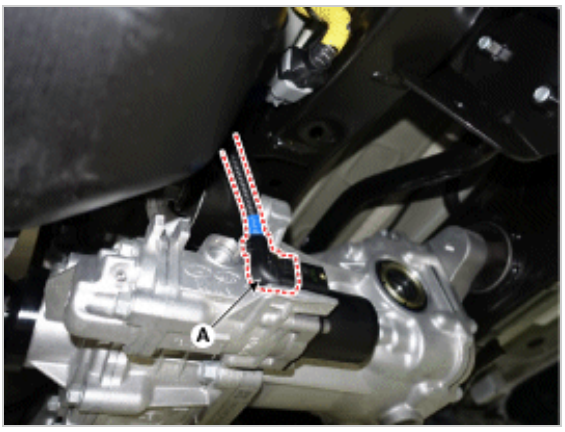
49.0 - 68.6N.m (5.0 - 7.0kgf.m, 36.2 - 50.6lb-ft)

⚠ CAUTION

- Do not reuse bolts.



2. Using a flat tool, separate the propellar shaft from AWD coupling assembly.
3. Disconnect the oil hydrulic motor connector (A).

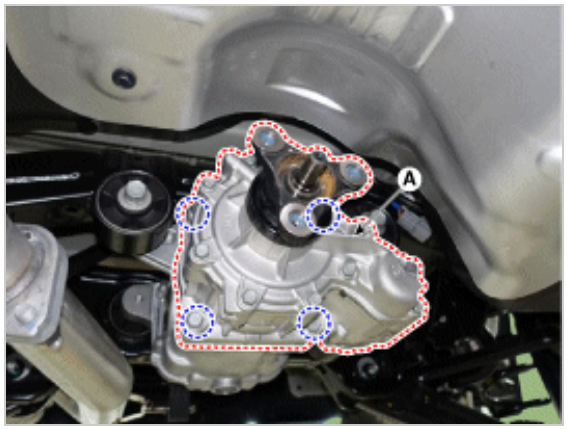


4. Disconnect the pressure sensor connector (A).

5. Loosen the coupling assembly mounting bolts.

Tightening torque :
58.9 - 64.7 N.m (5.8 - 6.6kgf.m, 41.9 - 47.7 lb-ft)

6. Using a flat tool, separate the AWD coupling assembly (A) from the rear differential carrier assembly.



- Installation

1. To install, reverse the removal procedures.

NOTICE

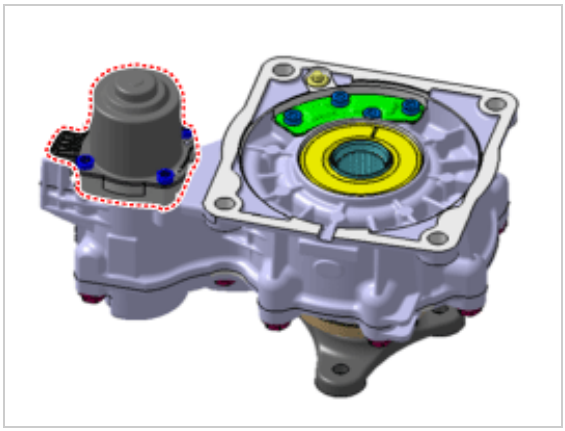
- Smear the splines (A) with molybdenum type high pressure grease.
- When install the coupling, be careful not to damage the oil seal (B).

Click to see large image...

2. After replacing the coupling, reset the AWD ECU's clutch learing using the GDS tool.
   (Refer to AWD Control System - "Repair procedures")

- Description

The AWD ECM controls the Pump Motor Pump (Actuator) to generating an oil pressure. The pressure engages a multiple disk clutch to transfer torque to the rear wheels. The torque to the rear wheels varies according to the pressure on the clutch.



- Circuit Diagram

Click to see large image...

- Inspection

Information

- If you have trouble code related to the oil hydraulic motor (actuator), check oil hydraulic motor (actuator) according to the inspection process.

Oil Hydraulic Motor (Actuator) Inspection Procedure

Click to see large image...

- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the coupling assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Coupling Assembly")

2. Keep going perpendicular state after remove the coupling assembly.

⚠ CAUTION

- Keep going perpendicular state during remove (install) the hydraulic motor (actuators).

Click to see large image...

- Use a tool (A) that allows the auxiliary operator to hold or seat the coupling in a vertical position.
- So that the input shaft side (B) is not damaged.

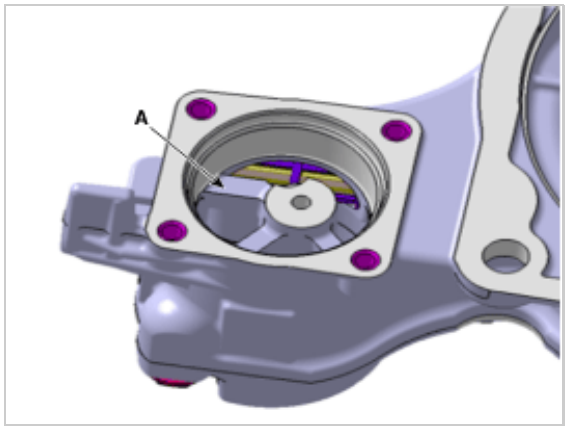
Click to see large image...

3. Remove the hydraulic motor (A) after loosening bolts with hex wrench.

Click to see large image...

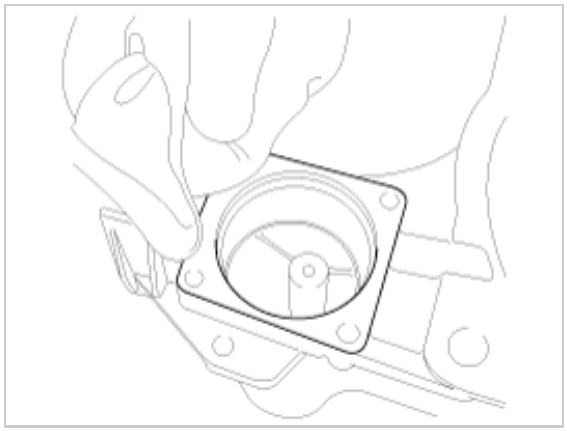
NOTICE

- Remove the hydraulic motor (actuators) after dropping residual oil as much as possible inside (A) the coupling. (abut 5-10 sec)



- Installation

1. Before installation, wipe the surface with a clean cloth.



2. Check the O-rings (A) of the new hydraulic motor (actuators).

Click to see large image...

NOTICE

- You have to prevent any dust from entering inside hydraulic motors (actuators) and housing.

3. Tighten the bolts after install the hydraulic motor.

NOTICE

- When installing, motor connector (A) has to toward in the direction of outside of the coupling.

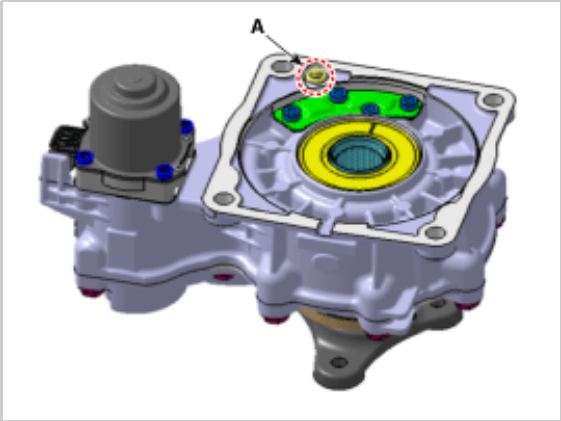
Tightening torque:

8.8 - 10.8 N.m (0.9 - 1.1 kgf.m, 6.5 - 8.0 lb-ft)

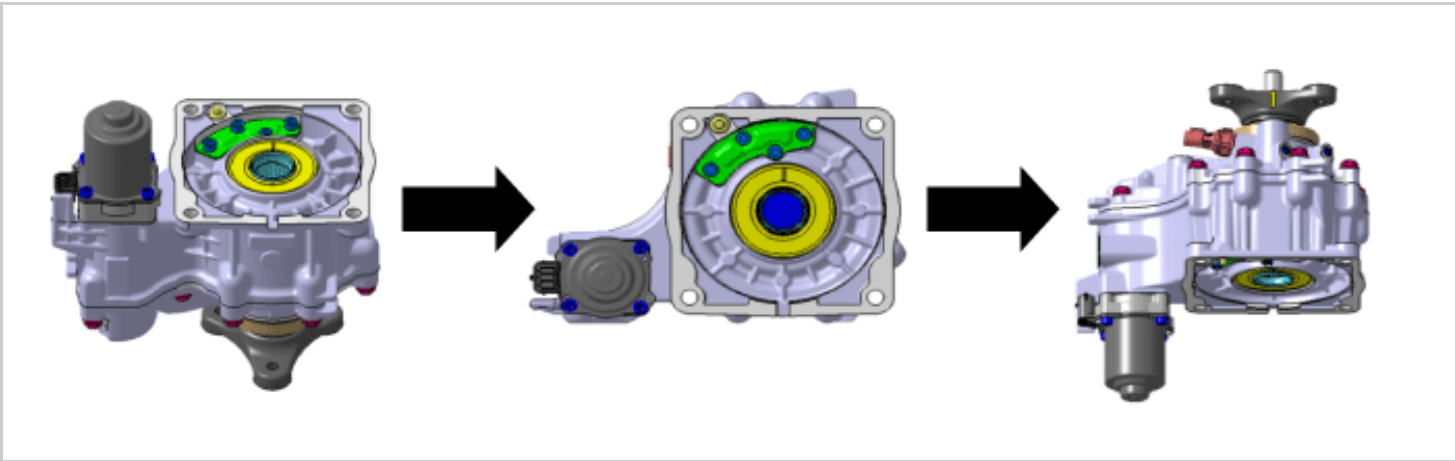
Click to see large image...

NOTICE

- When installing, oil can be reflux by the pressure in air breather hole (A).



- Change direction in the direction of the arrow and lay on the floor as shown in the illustration.
  ※ The reflux oil will flow to the bottom.
- You have to prevent additional backflow in according to order as shown in the illustration.



4. Wipe the flowed oil to around the surface (A) with a clean cloth.

Click to see large image...

5. Install the coupling assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Coupling Assembly")

- Description

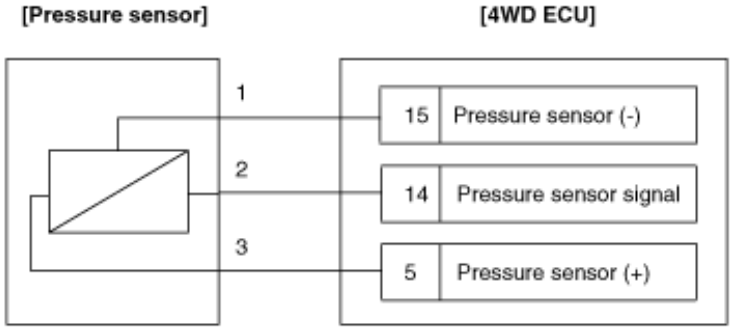
The AWD ECU makes a Motor Pump(Actuator) turn round for generating an oil pressure. And then it presses a multiple disk clutch and transfers the generated torque into rear wheels. Its torque value varies according to a pressure status.

- Component location

Click to see large image...

- Circuit Diagram

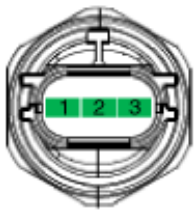
[Circuit diagram]



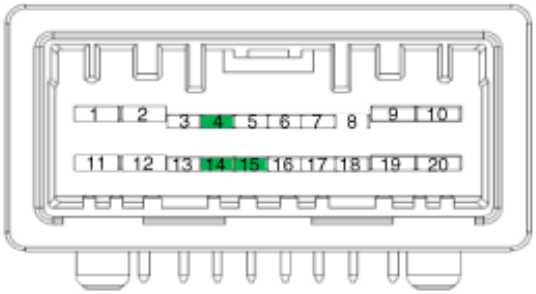
[Connection Information]

Terminal	Connected to	Function
1	4WD ECU (15)	Pressure sensor (-)
2	4WD ECU (14)	Pressure sensor signal
3	4WD ECU (5)	Pressure sensor (+)

[Harness connector]



[Pressure sensor]



[4WD ECU]

- Inspection

Measure the resistance of pressure sensor

1. Turn ignition switch OFF.
2. Disconnect the pressure sensor connector.
3. Measure resistance between sensor terminal and terminal.
4. Check the measured resistance. (Refer to table)

[Table 1]

Terminal	Resistance
PIN 2 – PIN 3	153.2 - 255.36 kΩ
PIN 1 – PIN 3	50.3 - 75.6 kΩ
PIN 1 – PIN 2	123.36 - 328.56 kΩ

- Removal

⚠ CAUTION

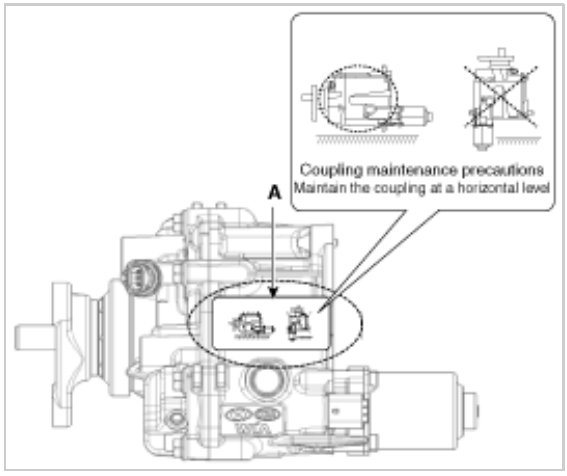
-

Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
(Refer to General Information - "Lift and Support Points")

1. Remove the coupling assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Coupling Assembly")

NOTICE

- Keep it level with the sticker (A) on the top of the coupling.

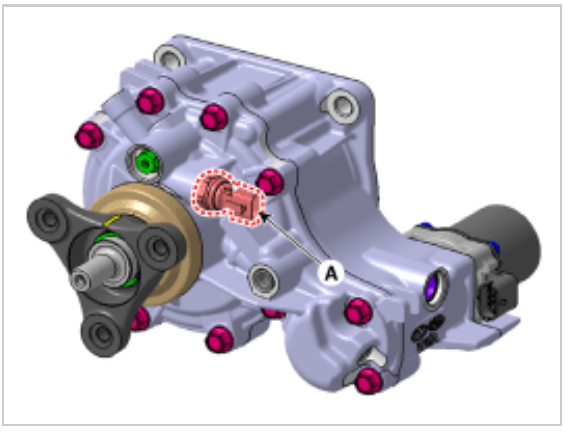


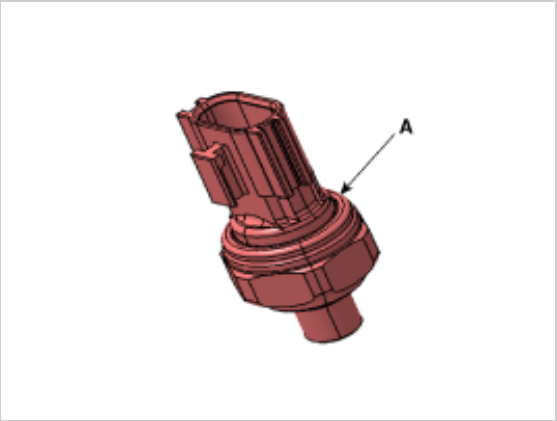
2. Remove the pressure sensor (A).

NOTICE

- Keep going horizontal state to prevent leaks during remove the pressure sensor.

Tightening torque:
10.8 - 14.7 N.m (1.1 - 1.5 kgf.m, 8.0 - 10.8 lb-ft)



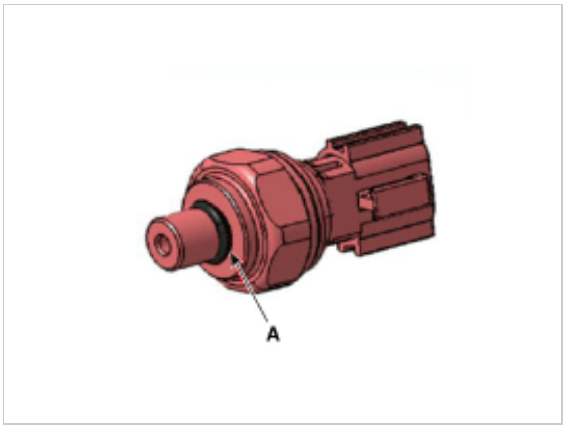


- Installation

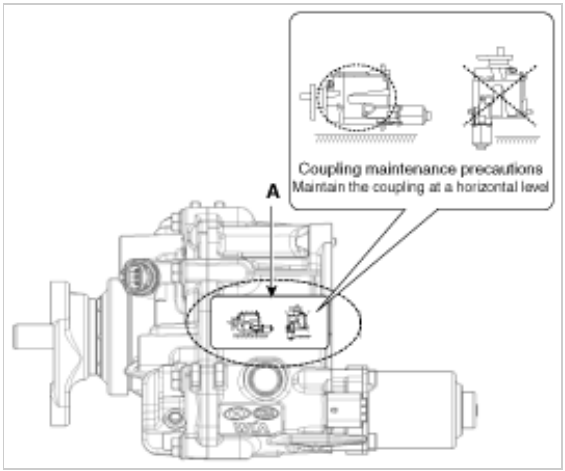
1. To install, reverse the removal procedure.

NOTICE

- Check the cleanliness of the pressure sensor before installation.
- Check the pressure sensor O-ring (A).



- Keep it level with the sticker (A) on the top of the coupling.



- Description

When the pressure inside the coupling exceeds the set pressure value, this valve maintains the pressure under the set value by discharging the partial or whole amount.

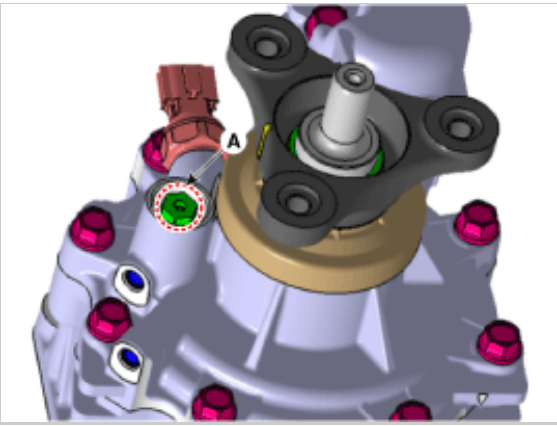
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Remove the coupling assembly.
   (Refer to 4 Wheel Drive (AWD) System - "Coupling Assembly")
2. Remove the relief valve (A) from the coupling assembly.

Tightening torque:
26.5 - 32.4 N.m (2.7 - 3.3 kgf.m, 19.5 - 23.9 lb-ft)



NOTICE

- Use a tool (A) that allows the auxiliary operator to hold or seat the coupling in a vertical position.
- Be careful not to let the air bleeder’s hole area (B) be pressed.

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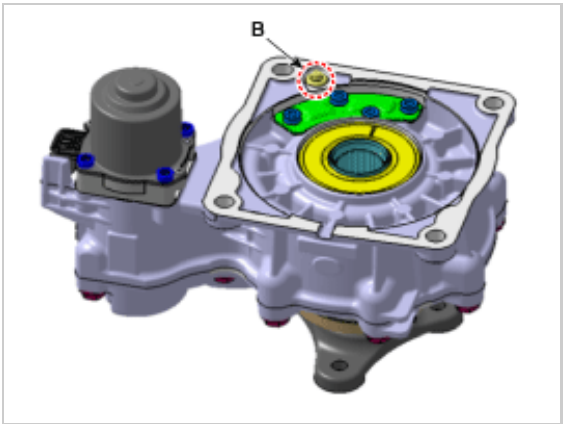

- Installation

1. To install, reverse the removal procedures.

NOTICE

- Wipe foreign substance on the cover tab (A) with a clean cloth before assembling.
- Check the O-ring (B) of the relief and apply suitable amount of Loctite 592 on the screw area (C)
- Be careful not to let any foreign substance inside the relief valve and cover

Click to see large image...

Click to see large image...